

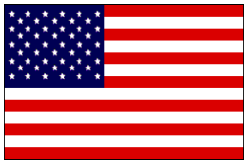

North America –

The Energy Picture II

prepared by

North American Energy Working Group
Security and Prosperity Partnership
Energy Picture Experts Group
January 2006

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North American Energy Working Group of the Security and Prosperity Partnership

On March 23, 2005, Canadian Prime Minister Paul Martin, Mexican President Vicente Fox, and U.S. President George W. Bush announced the Security and Prosperity Partnership (SPP or the Partnership) in Waco, Texas. In order to achieve the SPP's broader commitment of ensuring security and enhancing development in North America, the SPP included six Security Working Groups and 10 Prosperity Working Groups, designed to promote greater cooperation and information sharing in various areas, including a prosperity working group focused on energy.

In energy, it was agreed by all three countries that the cooperative efforts under the SPP would continue to occur under the ongoing North American Energy Working Group (NAEWG),[1] with new initiatives to be added as part of the recently established Partnership.

Under the SPP, the energy goals are to *"strengthen North America's energy markets by working together, according to our respective legal frameworks, to increase reliable energy supplies for the region's needs and development, by facilitating investment in energy infrastructure, technology improvements, production and reliable delivery of energy, by enhancing cooperation to identify and utilize best practices; and to streamline and update regulations by promoting energy efficiency, conservation, and technologies like clean coal."*[2]

To achieve these goals, the NAEWG exchanges views and shares information on factors affecting the North American energy sector, including policies and programs, market developments, anticipated demand, and future sources of supply. The Group also identifies issues that need to be addressed, such as regulatory structures, interconnections, technical specifications, and technology research and development.

The scope of the NAEWG's discussions includes all aspects of energy development: production, transportation, transmission, distribution, and consumption in North America. The Group also considers the full range of energy sources, as well as the efficient use of energy.

The first deliverable of the NAEWG, *North America – The Energy Picture*, was published in 2002. This release of *North America – The Energy Picture II* provides production, consumption, trade, policy, and infrastructure updates for the region since the original release. As a publication of the NAEWG, it reflects a joint perspective of the national energy departments of Canada, Mexico and the United States. Information on each

[1] Established in spring of 2001 by the Canadian Minister of Natural Resources, the Mexican Secretary of Energy, and the U.S. Secretary of Energy to enhance North American energy cooperation, the Group is led by officials from all three agencies.

[2] The Security and Prosperity Partnership website, http://www.spp.gov/spp/prosperity_working/index.asp?dName=prosperity_working.

country contained in this document has been provided through the relevant country's national energy department, which retains sole responsibility for the information on its country.

Under the SPP, the NAEWG will continue to foster communication and relationships, as well as remove barriers and enhance infrastructure interconnections and overall energy trade within North America. In addition, the Group will work to facilitate more efficient energy distribution throughout the continent. The continued commitment of Canada, Mexico, and the United States will produce a system from which each nation can benefit. Additionally, the NAEWG will continue to be an example of what can be achieved when genuine support, respect, understanding, friendship and cooperation exist amongst sovereign neighbors.

Contents

(1) Introduction

In March 2005, Canadian Prime Minister Paul Martin, Mexican President Vicente Fox, and U.S. President George W. Bush unveiled the Security and Prosperity Partnership (SPP), a broad effort to increase security and enhance prosperity among the three countries through cooperation and information sharing. The North American Energy Working Group (NAEWG), established in 2001, became one of the 10 Prosperity Working Groups under the SPP and plays an important role by strengthening the North American energy markets through continued trilateral cooperation.

Under the SPP energy work plan, submitted on June 23, 2005, the three nations' energy leaders committed to develop reliable, high-quality energy information for assessing the energy market's performance in North America**.** The goal of *North America – The Energy Picture II* is to assess and enhance trilateral energy trade information to improve the decisions of the governments and industries concerning energy policies, regulations, national security, and other significant regional issues, building upon *North America – The Energy Picture* (June 2002).[3] The 2002 report was one of the first outcomes of NAEWG and represented the first time energy data provided by the three countries was presented side-by-side in one document as an effective resource for participants in the North American energy sector.

This updated version will allow energy stakeholders to gain an accurate snapshot of the North American energy sector in 2005, as well as developments in the energy market over the past 25 years.

As *North America – The Energy Picture II* continues to show, North America is one of the world's most important regions for energy – producing about one-fourth of global energy supply and consuming about one-third of the world's commercial energy. National markets have grown over the years in both magnitude and complexity. Today, North America must concern itself with a range of energy issues including energy resources, reserves, technologies, infrastructure, trade, investment, laws, regulations, the environment, employment, security, and other factors affecting the development of the energy market's performance. In addition to energy, North America has a broad range of other important economic, social, technological, and environmental issues that require cross-border communication and cooperation. *North America – The Energy Picture II* builds on the 2002 document and places the region's current energy issues in a trilateral context by discussing the many elements that compose and affect the North American energy sector. The report contains:

- A regional overview of the main indicators of the economies of Canada, Mexico and the United States.

[3] The first report from 2002 was a result of the 2001 agreement between the then-Canadian Prime Minister Jean Chretien, Mexican President Vicente Fox, and U.S. President George W. Bush to enhance regional cooperation on energy issues.

- A review of the energy supply that identifies the composition of North America's resources.

- A report on energy demand that illustrates the scope of the region's diverse energy needs.

- A picture of energy trade that provides a view of the volumes traded among the three countries.

- Infrastructure and regulatory and policy sections that offer information on the organization and characteristics of the three countries' individual energy sectors.

- New sections highlighting the emerging liquefied natural gas (LNG) industry.

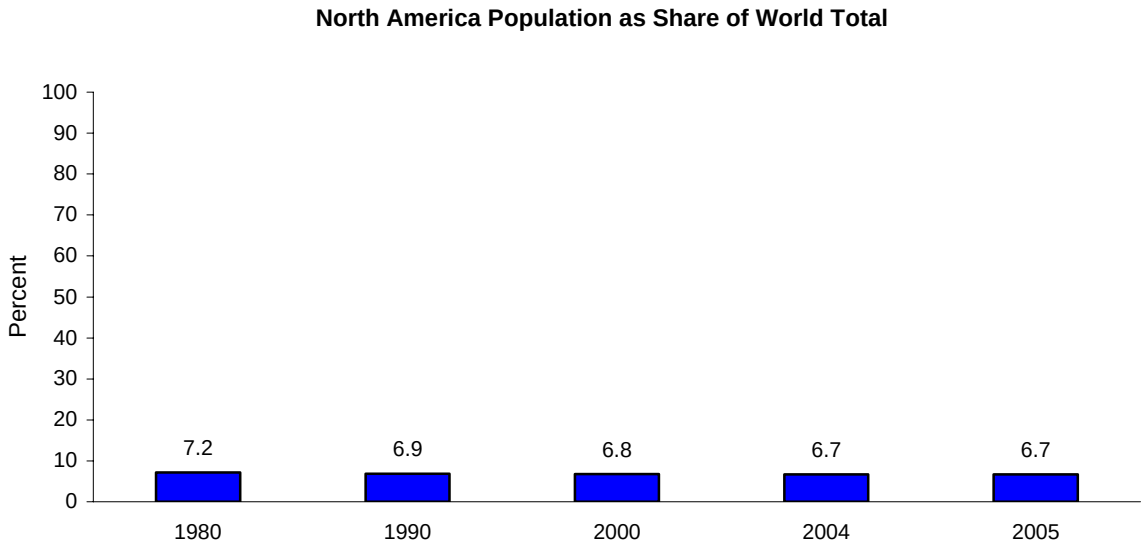
- A detailing of important energy activities on the national and regional levels providing insight into the achievements of the NAEWG and further cooperation in the energy sector.

- Comprehensive energy data, with detailed tables in an appendix.

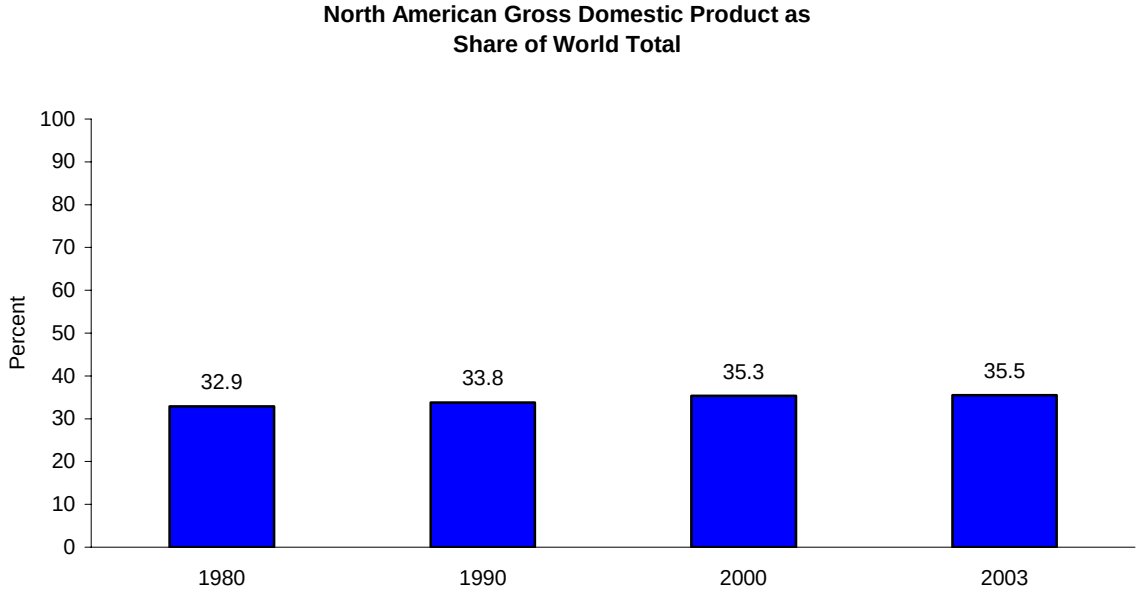
- Further appendices that provide overviews of the history of the NAEWG and the properties of liquefied natural gas.

North America – The Energy Picture II reflects a joint perspective of the national energy departments of Canada, Mexico and the United States and serves as a reference document for use by government, business and the public. Information on each country contained in this document has been provided through the relevant country's national energy department, which retains sole responsibility for the information on its country.

(2) North America – Economic Overview

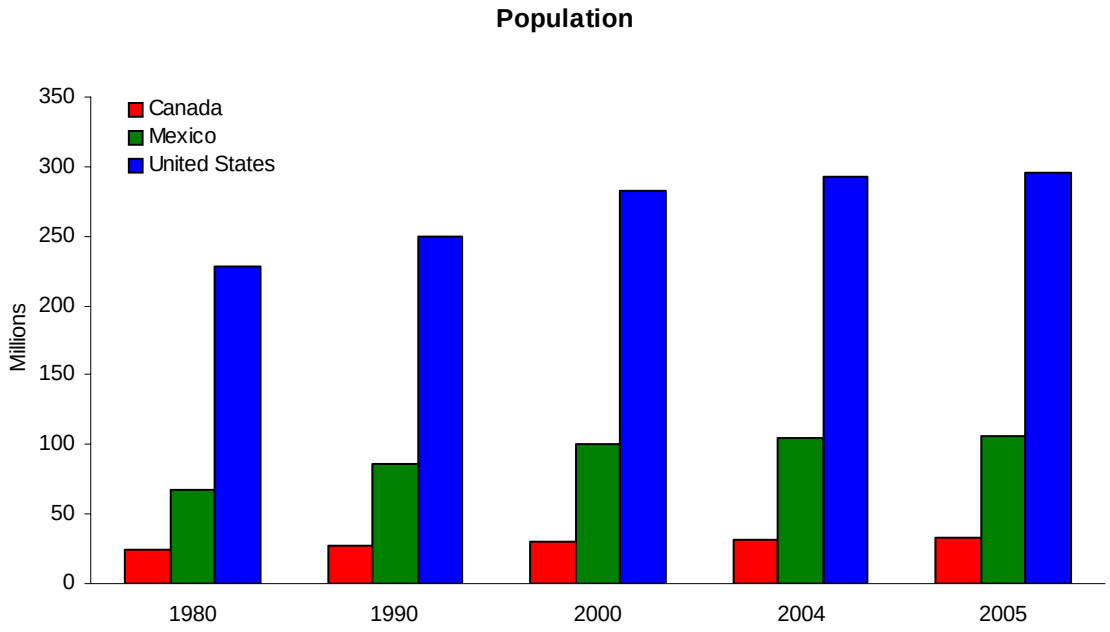


- North America, with about 7 percent of the world's population, accounts for roughly one-third of world economic output.

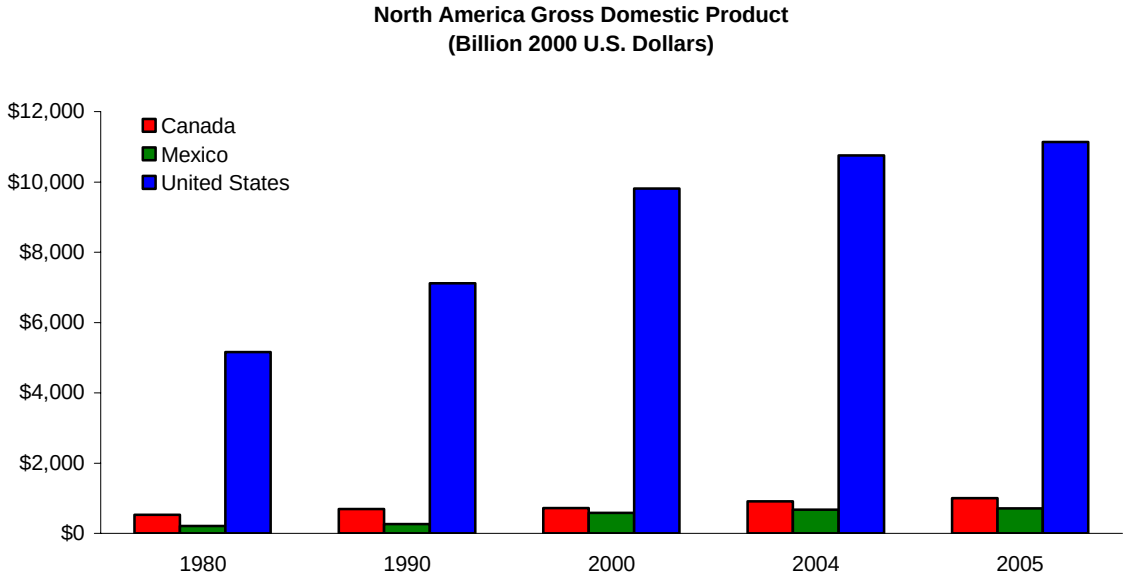


- North America's per capita Gross Domestic Product (GDP) in constant 2000 U.S. Dollars in 2003 was $27,977, about five times the world average per capita GDP. Both real GDP and real income per capita have been growing since 1980.

North American Economic Trends



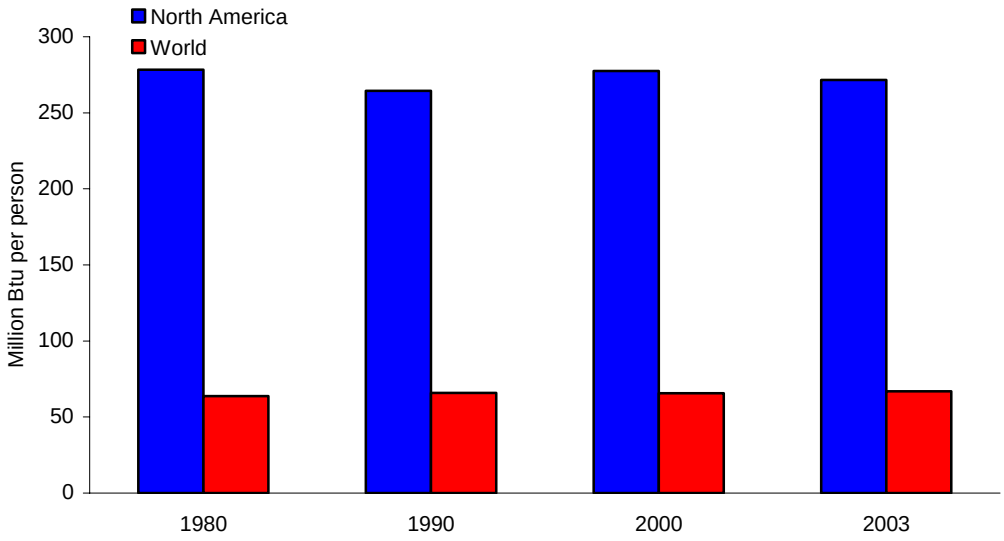
- In 2004, North America's population was 430 million: Canada's population was 32 million, Mexico's was 105 million, and the United States' was 293 million.



- In 2004, Canada's Gross Domestic Product totaled $910 billion (constant 2000 U.S. Dollars), compared to $676 billion (constant 2000 U.S. Dollars) for Mexico and $10,756 billion (constant 2000 U.S. Dollars) for the United States.

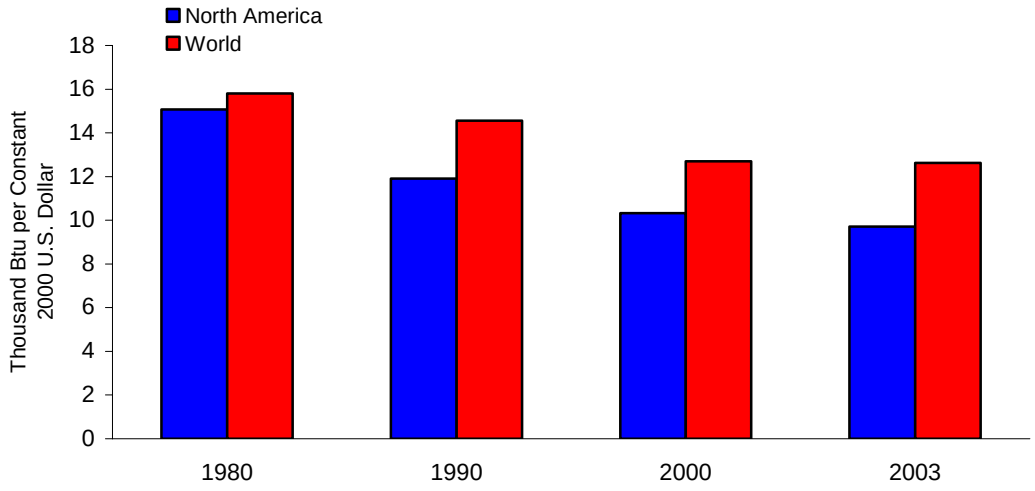
North America in the Global Energy Economy

Energy Consumption per Capita, North America vs. World



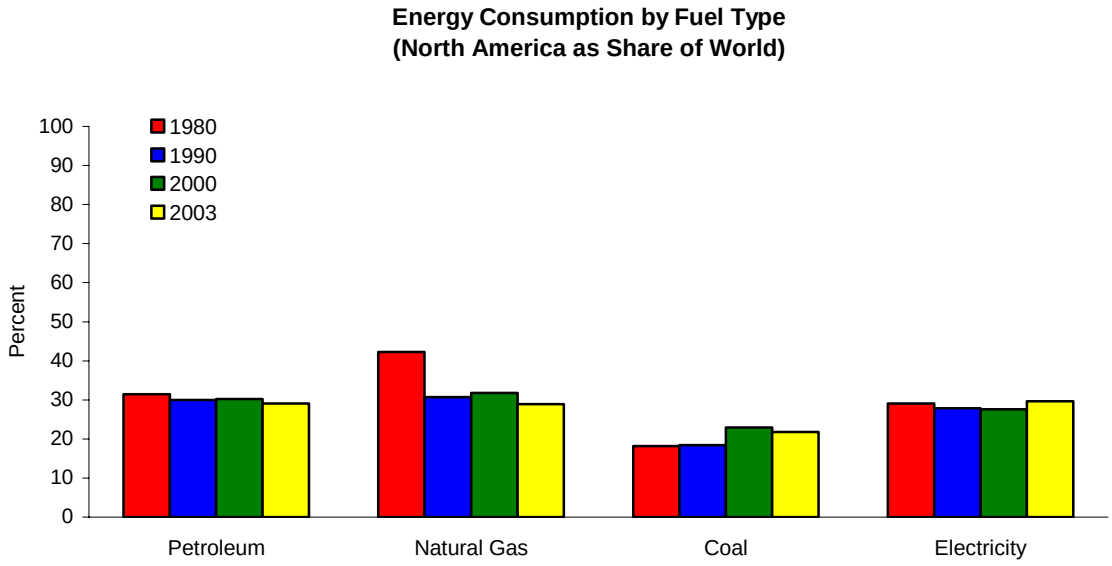
- In 2003, North America's per capita energy consumption was about four times greater than the world average.

Energy Consumption per Unit of Gross Domestic Product, North America vs. World

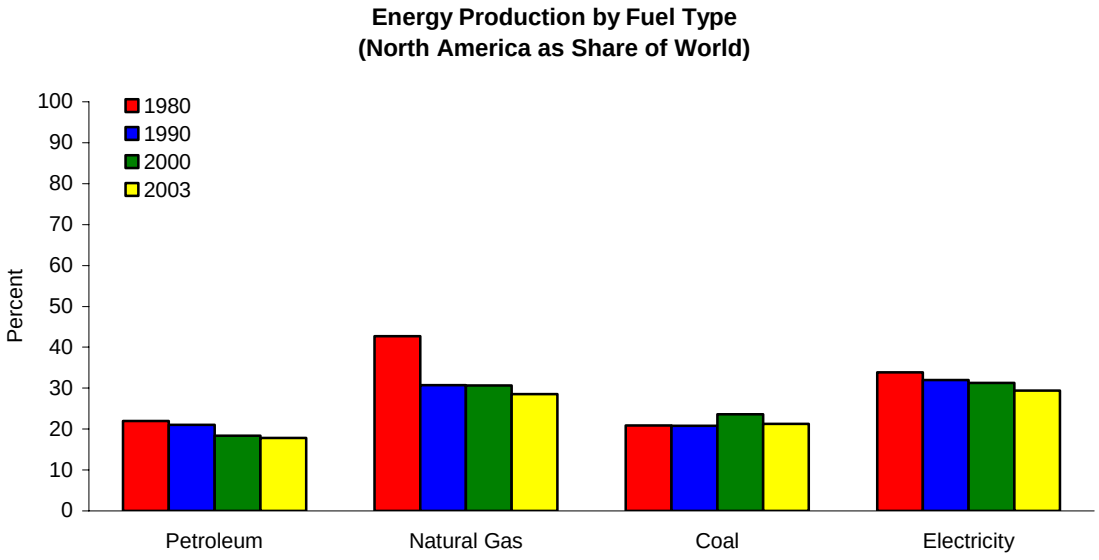


- North American energy consumption per unit of Gross Domestic Product was about three-quarters of the world average in 2003.

North America in the Global Energy Economy

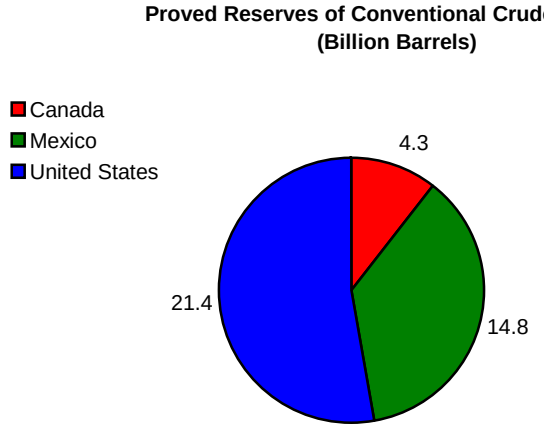


- In 2003, North American accounted for substantial amounts of world energy demand. North America's shares of world demand included petroleum (29 percent), natural gas (29 percent), coal (22 percent), and electricity (30 percent).



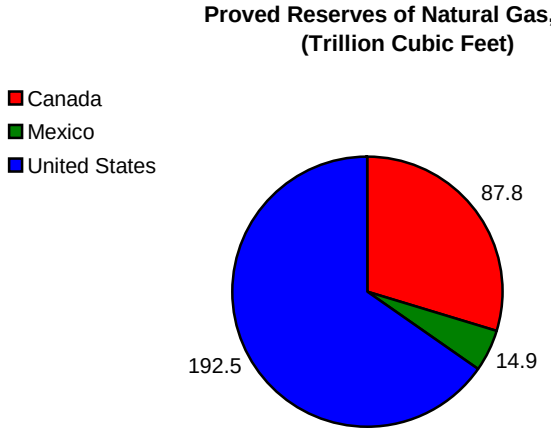
- In 2003, North America accounted for around 18 percent of world petroleum production, 29 percent of world natural gas production, 21 percent of world coal production, and 29 percent of world electricity generation.

(3) North America – Energy Supply



- At the end of 2004, North America had conventional crude oil reserves of about 40 billion barrels, roughly 3 percent of the world total.

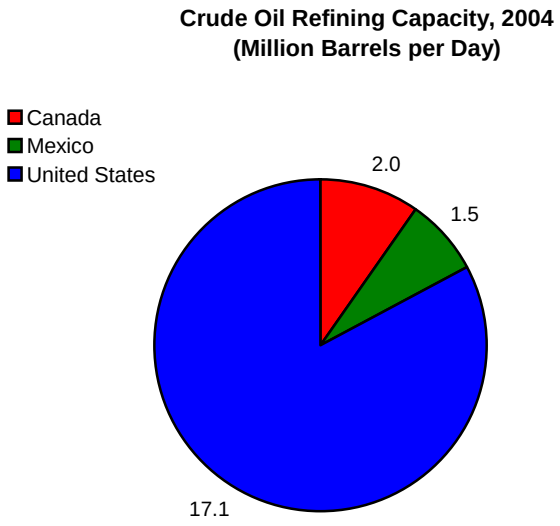
- The United States, with 21.4 billion barrels, has the largest proved reserves of conventional crude oil in North America, followed by Mexico (14.8 billion barrels) and Canada (4.3 billion barrels). In addition, Canada has proven reserves of oil sands of approximately 175 billion barrels, over four times the total of North America's conventional crude oil.



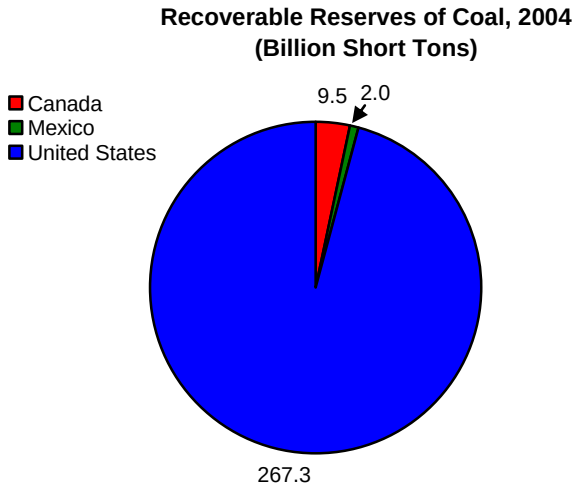
- At the end of 2004, North America had natural gas reserves of about 295 trillion cubic feet (Tcf), roughly 5 percent of the world total.

- The United States, with 192.5 Tcf, has the largest natural gas reserves in North America, followed by Canada (87.8 Tcf) and Mexico (14.9 Tcf).

North American Energy Supply

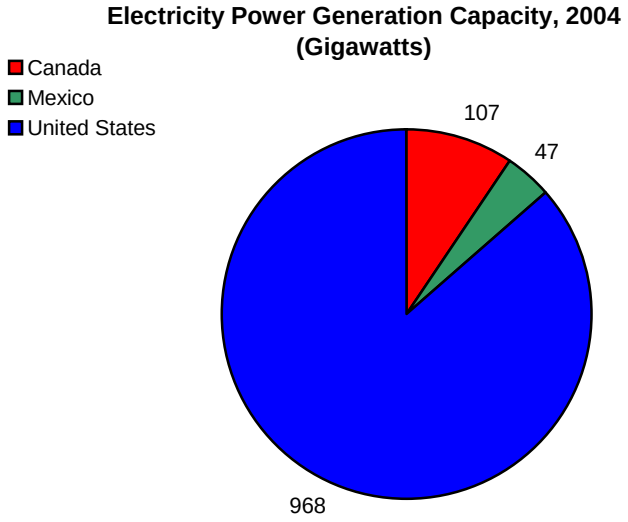


- At the end of 2004, North America had about 21 million barrels per day (MMbbl/d) of crude oil refining capacity. The shares included Canada, 2.0 MMbbl/d; Mexico, 1.5 MMbbl/d; and the United States, 17.1 MMbbl/d. North American crude oil refining capacity accounts for about 25 percent of total world refining capacity.



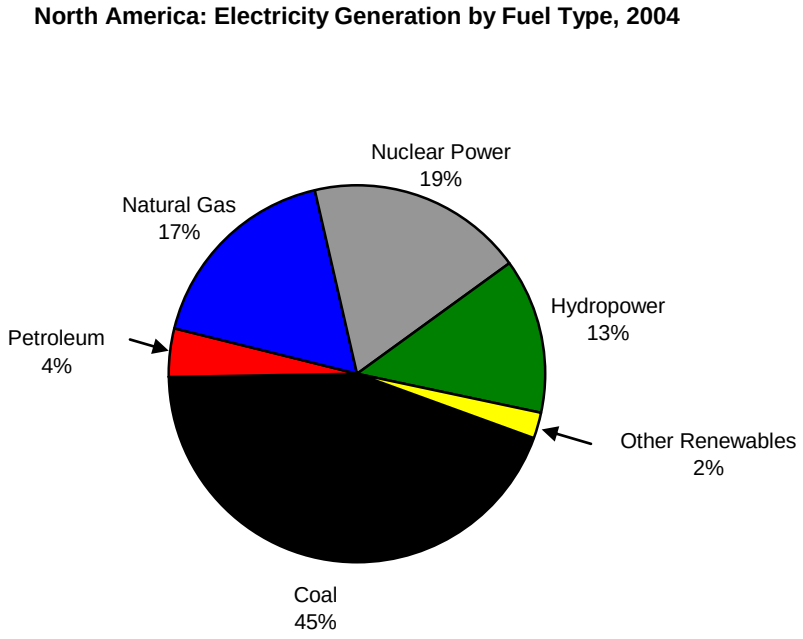
- In 2004, North America had coal reserves of 279 billion short tons, about 96 percent of which were located in the United States. North American coal reserves account for around 28 percent of total world coal reserves.

North American Electricity Generation



Total Capacity = 1,112 gigawatts

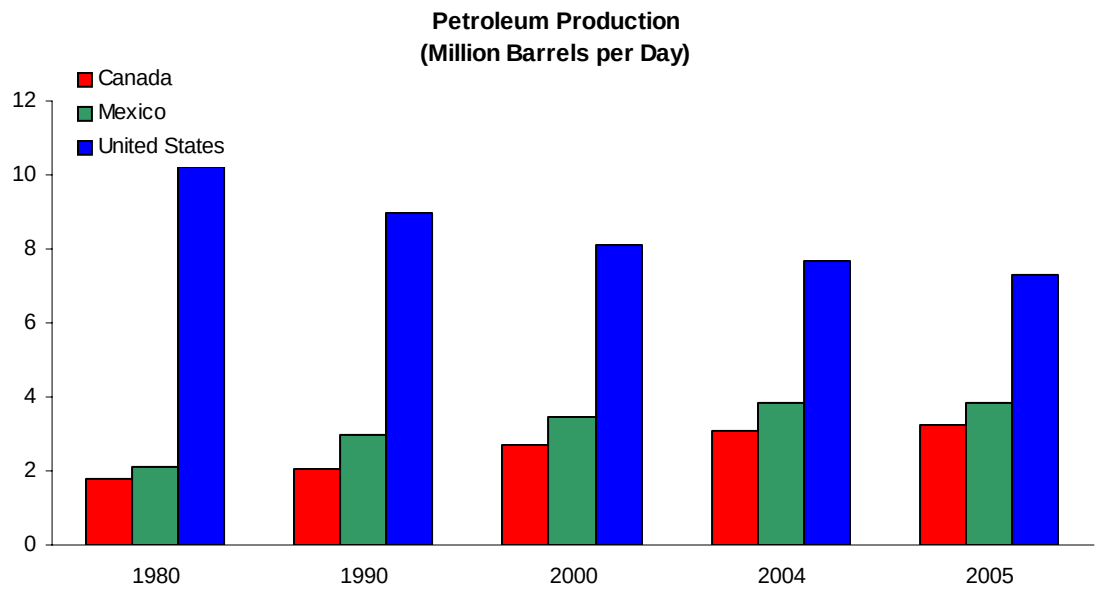
- In 2004, North America had 1,122 gigawatts of electric power generation capacity. The capacity shares were Canada, 107 gigawatts; Mexico, 47 gigawatts; and the United States, 968 gigawatts.



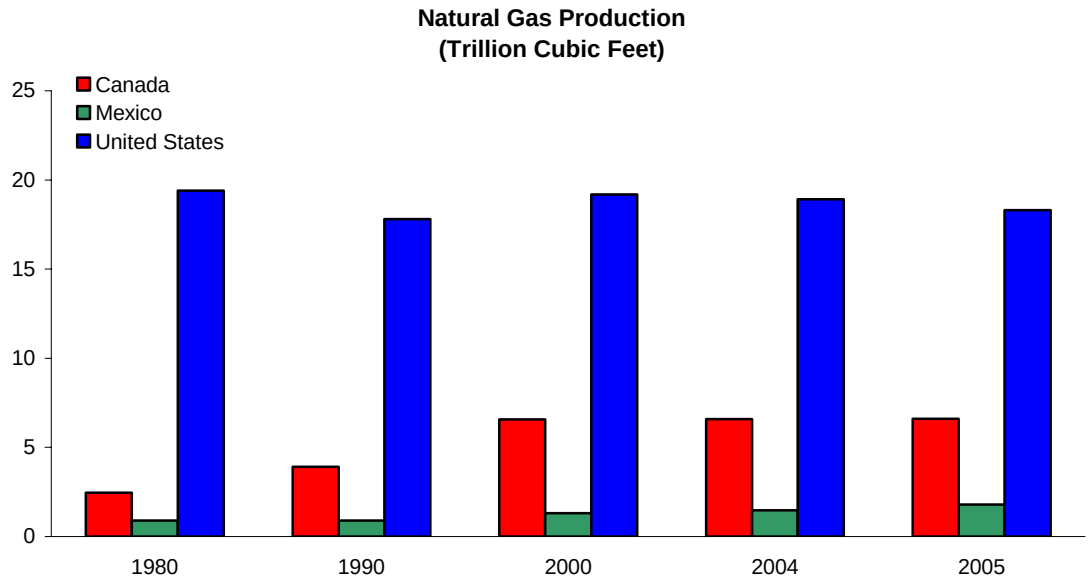
Total Generation = 4730 terawatthours

- North America generated 4,730 terawatthours of electricity in 2004, of which 45 percent was coal-fired, 19 percent nuclear, 17 percent natural gas, 13 percent hydroelectric, 4 percent petroleum, and 2 percent other renewable energy.

North American Energy Production

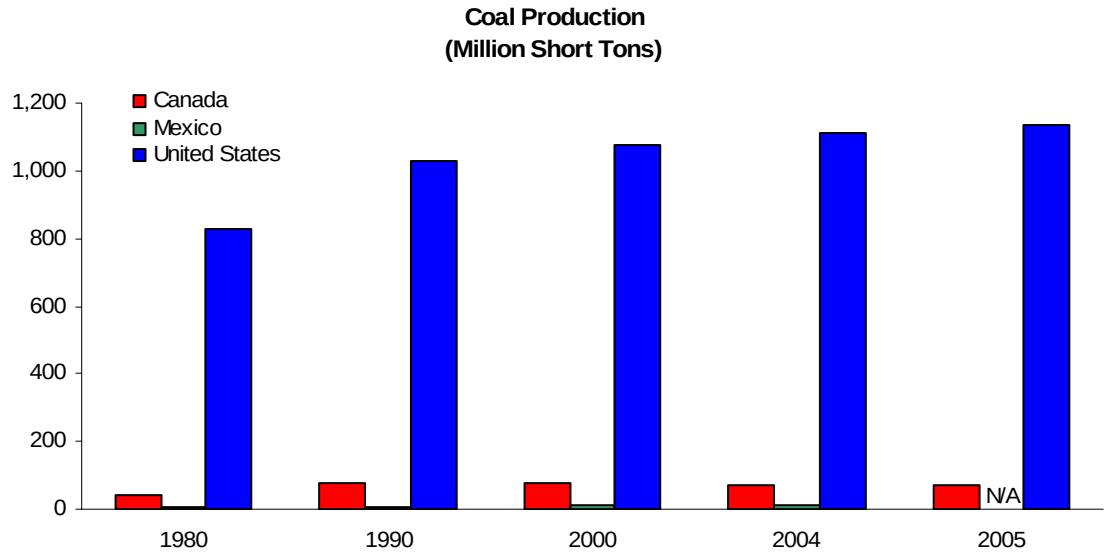


- North America produced over 14 millions barrels per day (MMbbl/d) of petroleum in 2004: Canada, 3.1 MMbbl/d; Mexico, 3.8 MMbbl/d; and the United States, 7.6 MMbl/d.



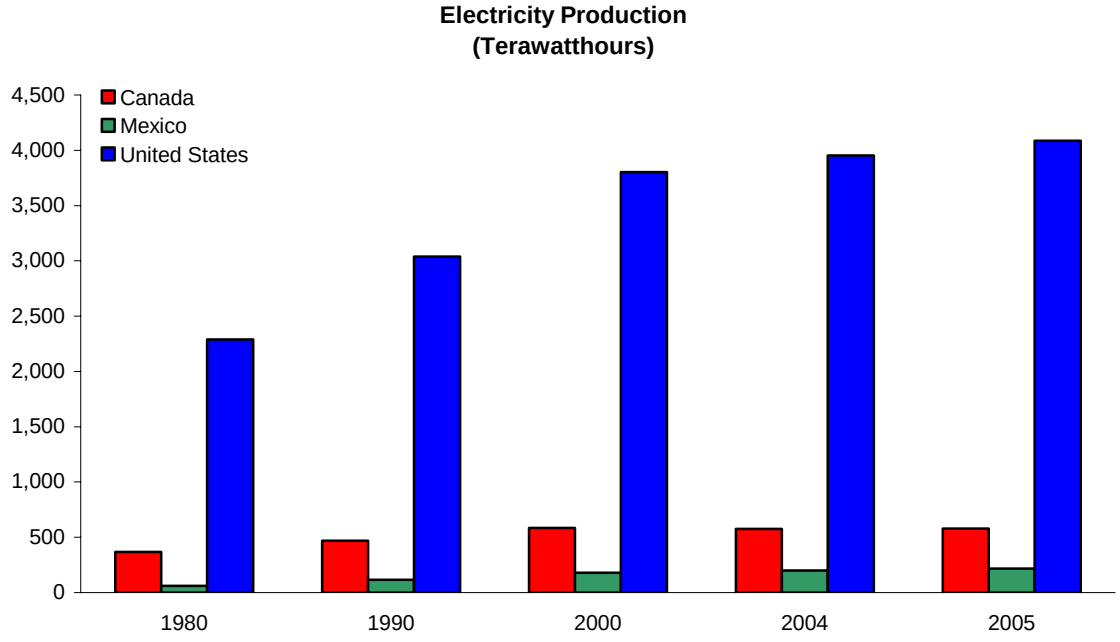
- In 2004, U.S. natural gas production was 18.9 trillion cubic feet (Tcf), compared to 6.6 Tcf in Canada and 1.5 Tcf in Mexico.

North American Energy Production



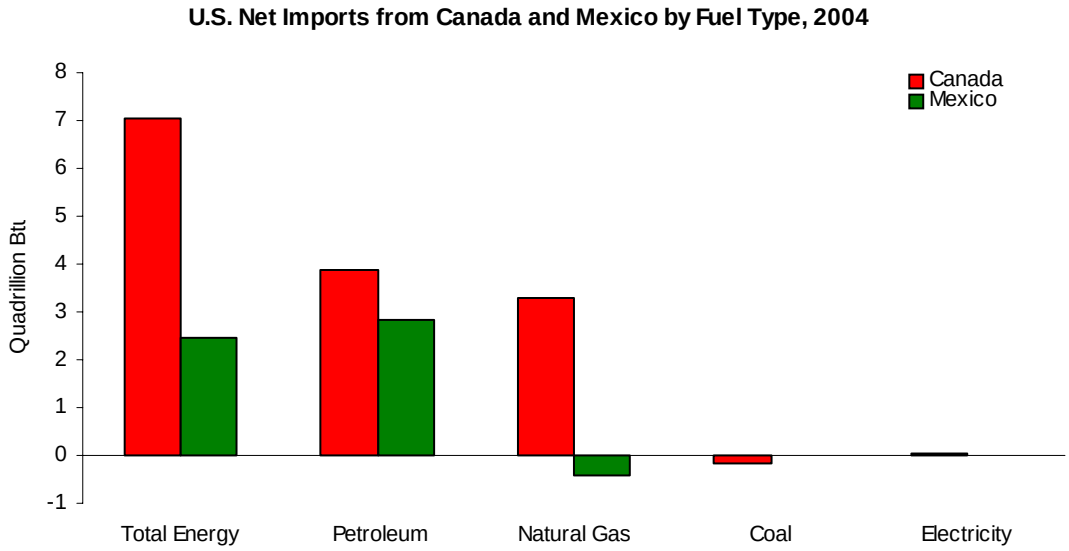
N/A = Not Available

- North American coal production in 2004 was about 1,196 million short tons (MMst). Canada produced 73 MMst; Mexico produced 11 MMst; and the United States produced 1,112 MMst.



- North American electricity generation was about 4,730 terawatthours (Twh) in 2004. Canada generated 576 Twh; Mexico generated 201 Twh, and the United States generated 3,953 Twh.

North American Energy Trade



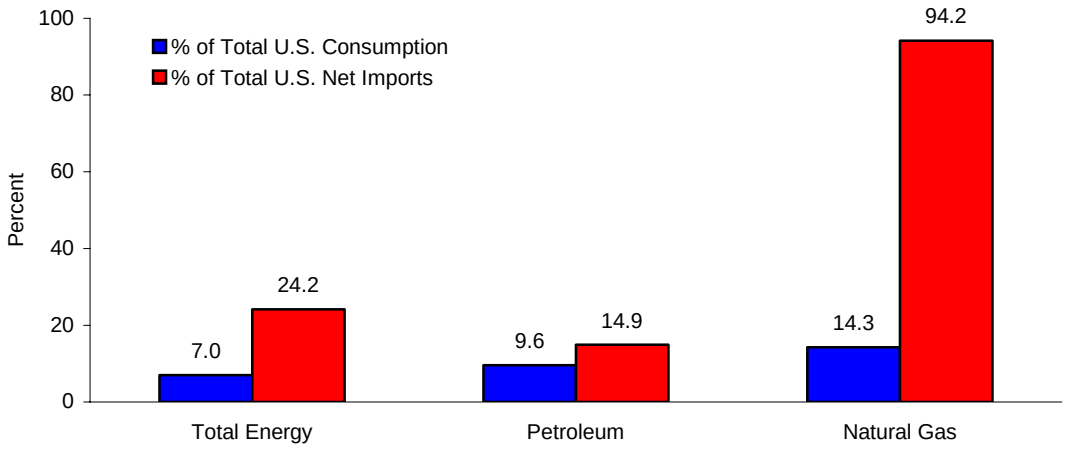
- The United States is a major, and growing, net importer of energy. In 2004, the United States net imports of energy exceeded 29 quadrillion Btu (quads), up from around 12 quads in 1980 and 14 quads in 1990.

- U.S. net imports of petroleum from Canada and Mexico stood at 6.7 quads in 2004. In that same year, both Canada and Mexico were net importers of U.S. coal.

- In 2004, U.S. net imports from Canada totaled 3.3 quads of natural gas and less than 0.04 quads of electricity.

North American Energy Trade

U.S. Net Energy Imports from Canada, 2004
(As Percent of U.S. Consumption & Net Imports, by Fuel Type)

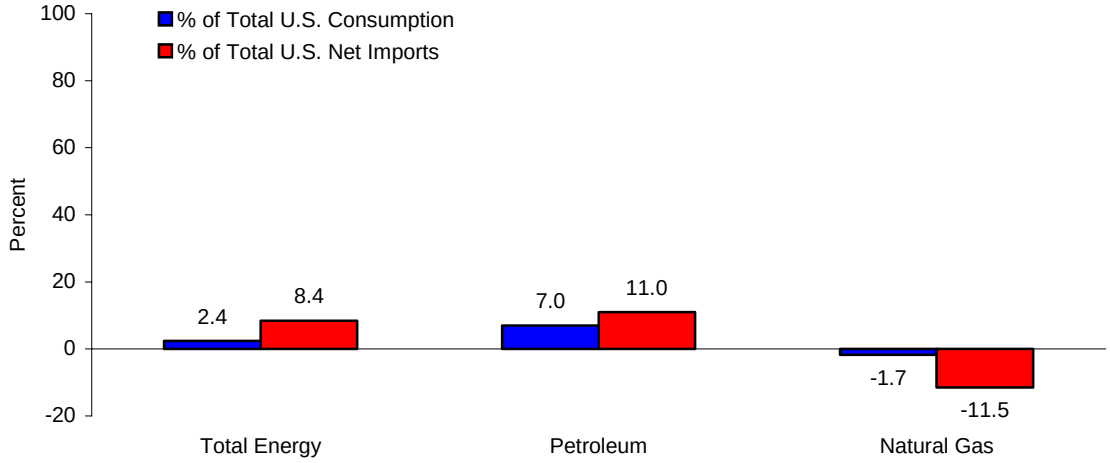


- In 2004, about 33 percent of total U.S. net energy imports came from Canada (24.2 percent) and Mexico (8.4 percent).

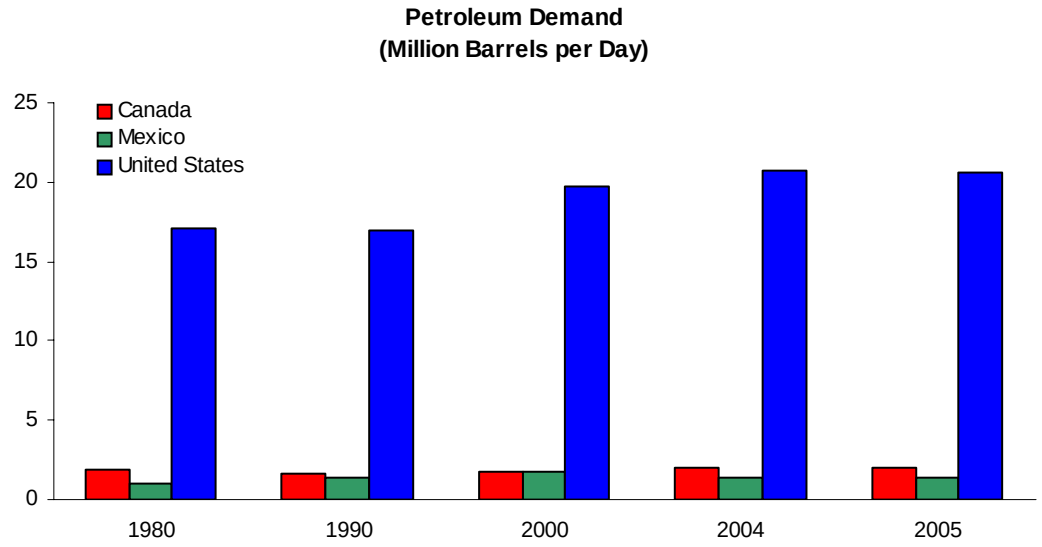
- Canada provided more than 94 percent of U.S. net imports of natural gas in 2004. These imports accounted for about 14 percent of U.S. natural gas consumption in 2004.

- U.S net imports of petroleum from Canada and Mexico accounted for about 26 percent of U.S. net petroleum imports and almost 17 percent of total U.S. petroleum consumption.

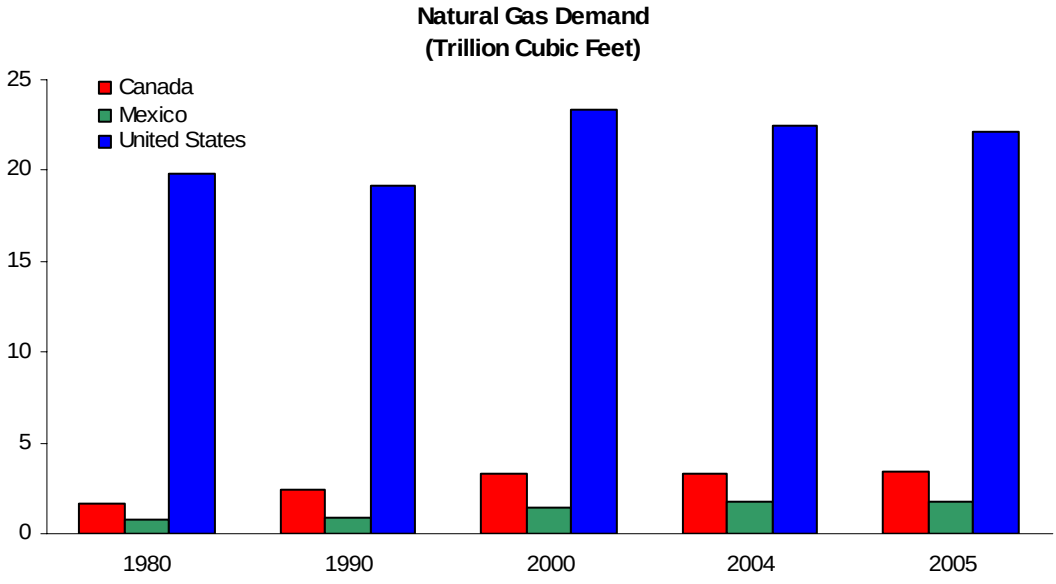
U.S. Net Energy Imports from Mexico, 2004
(As Share of U.S. Consumption & Net Imports, by Fuel Type)



(4) North America – Energy Demand

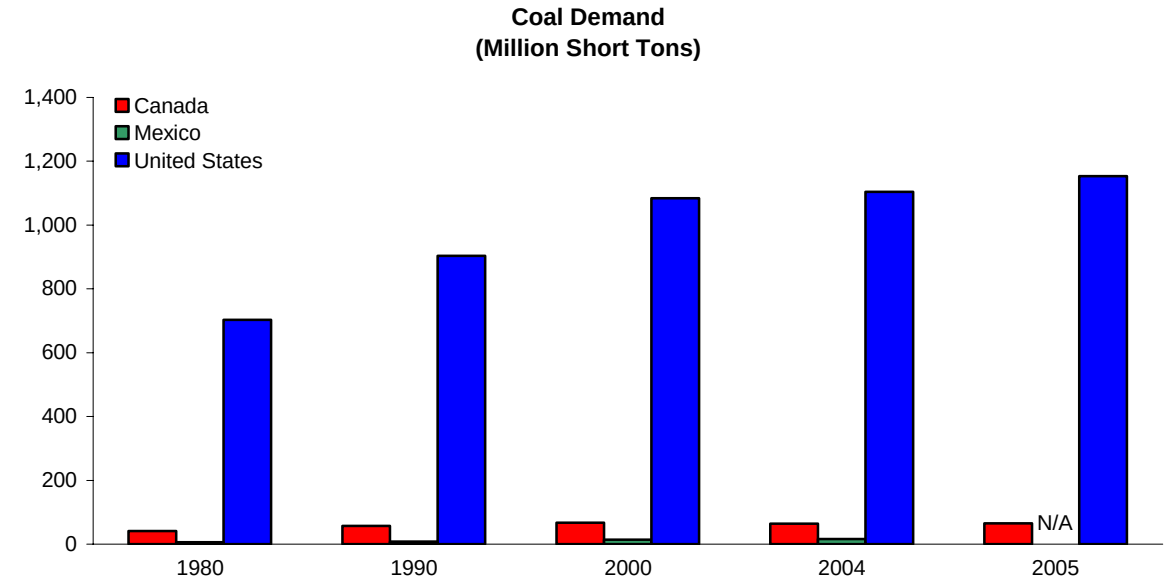


- North American consumed about 24 million barrels per day (MMbbl/d) of petroleum in 2004, or about 29 percent of estimated world demand. Canada consumed 2.0 MMbbl/d, Mexico consumed 1.4 MMbbl/d, and the United States consumed 20.7 MMbbl/d.



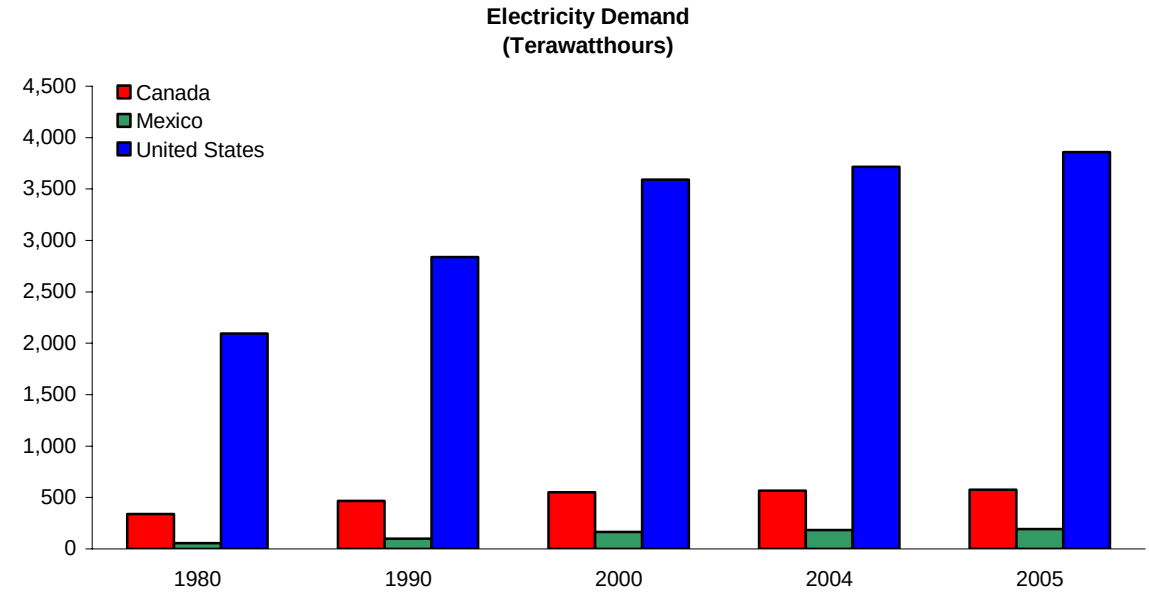
- North America consumed about 27.5 trillion cubic feet (Tcf) of natural gas in 2004. Canada consumed 3.3 Tcf, Mexico consumed 1.8 Tcf, and the United States consumed 22.4 Tcf.

North American Energy Demand



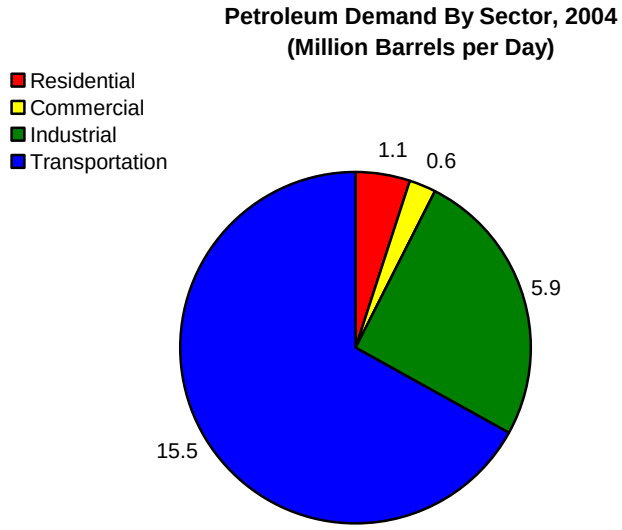
N/A = Not Available

- In 2004, North America consumed about 1,184 million short tons (MMst) of coal. Canada consumed 64 MMst of coal, while Mexico consumed 16 MMst and the United States consumed 1,104 MMst.



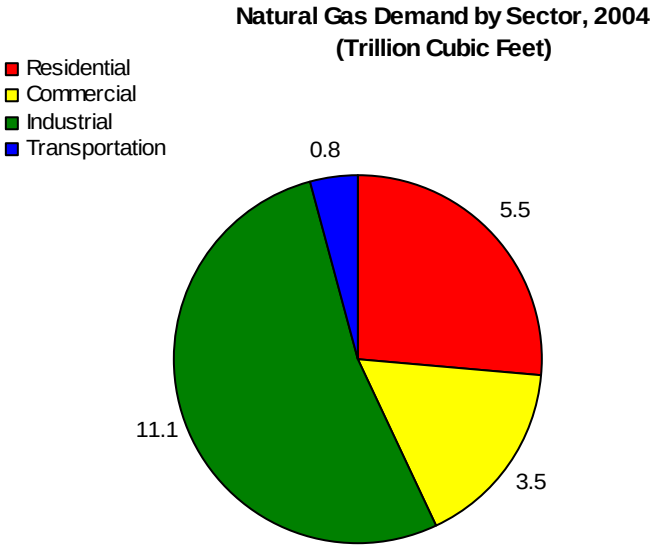
- North America consumed about 4,466 terawatthours (Twh) of electricity in 2004. Canada consumed 566 Twh, Mexico consumed 184 Twh, and the United States consumed 3,717 Twh of electricity.

North American Energy Demand



Total Demand = 23.13 Million Barrels per Day

- In 2004, the North American transportation sector consumed about 15.5 million barrels per day (MMbbls/d) of petroleum. During this time, the Canadian transportation sector consumed 1.0 MMbbls/d of petroleum, while the Mexican transportation sector consumed 0.9 MMbbls/d and the United States transportation sector consumed 13.6 MMbbls/d.



Total Demand = 20.97 Trillion Cubic Feet

- In 2004, the North American industrial sector consumed 11.1 trillion cubic feet (Tcf) of natural gas. During this time, the Canadian industrial sector consumed 2.1 Tcf, while the Mexican industrial sector consumed 0.5 Tcf and the United States industrial sector consumed 8.5 Tcf.

(5) North America – Infrastructure

North America's energy infrastructure and energy flows (oil, natural gas, coal, and electricity) are increasingly interconnected. Both the quantity of flows and the complexity of the infrastructure are growing. This section includes maps of fossil fuel reserves, current energy infrastructure, and possible new energy interconnections in North America.

- Cross-border oil flows are very important to the region's economies. Canada and Mexico are key suppliers of crude oil to the United States. Oil products flow back and forth among the countries – conveyed in trucks, and pipelines and by ship.

- Canada ships major quantities of its natural gas output to the United States through several pipeline connections.

- Natural gas flows between the United States and Mexico, with Mexico importing more gas from the United States than it exports to the United States. There are several pipeline connections.

- Both Canada and the United States are net coal exporters, some of which is metallurgical coal. Mexico imports small quantities of coal from the United States.

- Electricity connections across the borders of the three countries provide important regional supplies and help offset the need for expansion of national capacity

Oil Infrastructure in North America

Though much of the oil infrastructure in North America is well developed, there are continual new structural requirements for exploration, development, production, refining, transport, and storage. These needs present important issues for investment, trade, and development.

North America's oil industry operates within an array of different national, state, and provincial laws. Section 6 of this report provides detail about the legal and regulatory environment within North America. There are important differences among the various national jurisdictions. In Canada, although the federal government has jurisdiction over inter-provincial and international trade, the legal authority over most resources and infrastructure resides with the provinces. In Mexico, *Petróleos Mexicanos* (Pemex) has control over infrastructure and resources for most of Mexico's petroleum industry including exploration, development, production, refining, and the basic petrochemical industry. In the United States, infrastructure and resources on federally controlled public land (including offshore areas) are under the control of the federal government. Other resources

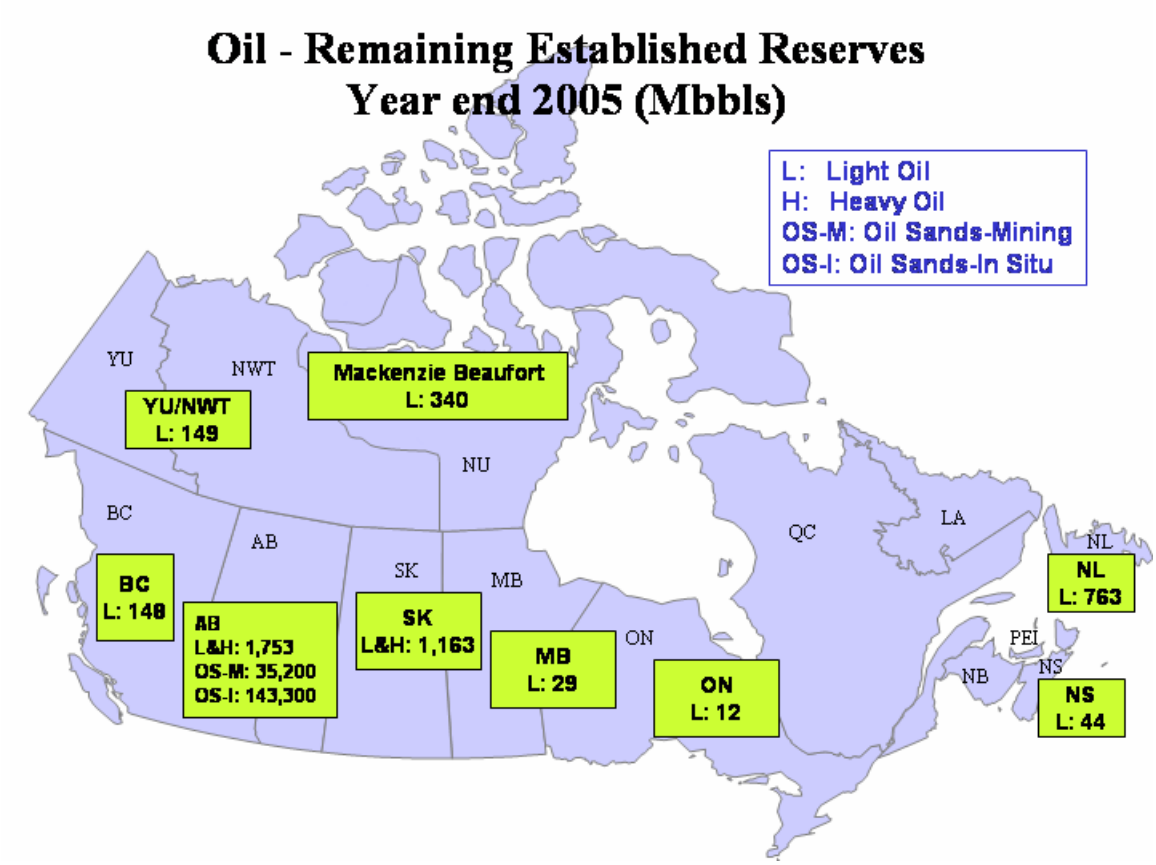
and infrastructure development, production, and refining are mostly privately owned. Businesses engaged in interstate commerce are subject to federal laws and regulations.

North America has a generally modern and adequate oil infrastructure compared to many regions of the world. Nonetheless, there is an on-going requirement for development and upgrades. Technical and transport factors are particularly important to infrastructure development in the petroleum industry. At a technical level, the characteristics – such as the gravity and sulphur content – of the oils to be processed or transported affect infrastructure requirements. Distances between production and refining require infrastructure for transport.

The physical characteristics of crude oils play an important role in cross-border cooperation and infrastructure development in North America. Some of North America's key oil resources require extensive processing before being ready for market. For example, Canada's huge resources of oil from oil sands require large commitments of infrastructure for their development, upgrading, transport, and processing. Mexico's heavy crude oils (Maya) also require significant development, transport, and refinery adaptations. North America has a very large market for lighter oils (gasoline, jet fuel, liquefied petroleum gases) that requires significant processing from heavy oils. There are some examples of cross-border cooperation that have helped address the regional needs. Pemex – Mexico's state oil company – is working on various projects with companies in the United States, in which the U.S. companies develop refinery-coking capabilities and Pemex provides longer-term supplies of heavy Maya crude oil. Shell Oil (United States) at Deer Park, Texas is an example.

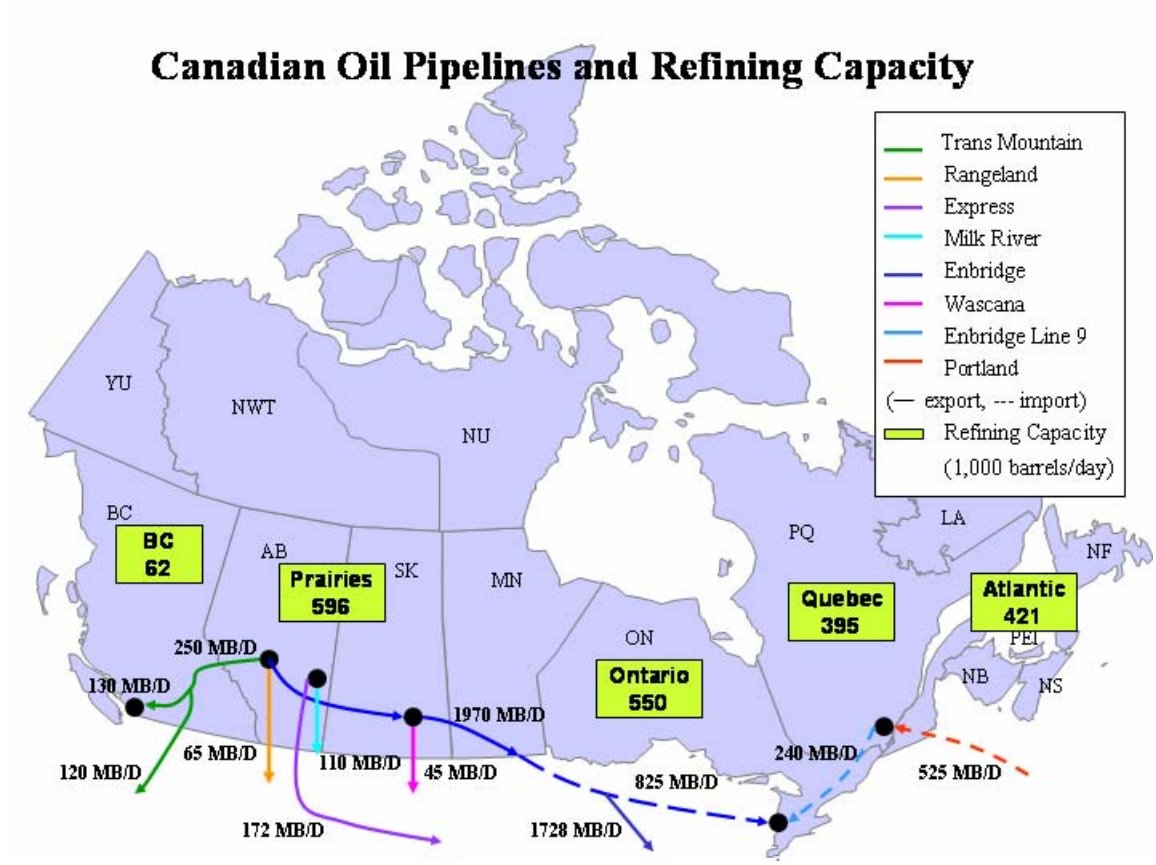
Distant resources require infrastructure for transport. Canada's crude oil in the west (Alberta) and sweet crude in Newfoundland are both distant from key markets in Ontario, Quebec and the United States. Mexico's production requires transport both inland and across the Caribbean. The United States transports oil great distances from Alaska.

Oil – Canada



- Alberta's oil sands reserves put Canada among the world's leaders in established oil reserves.

Oil – Canada

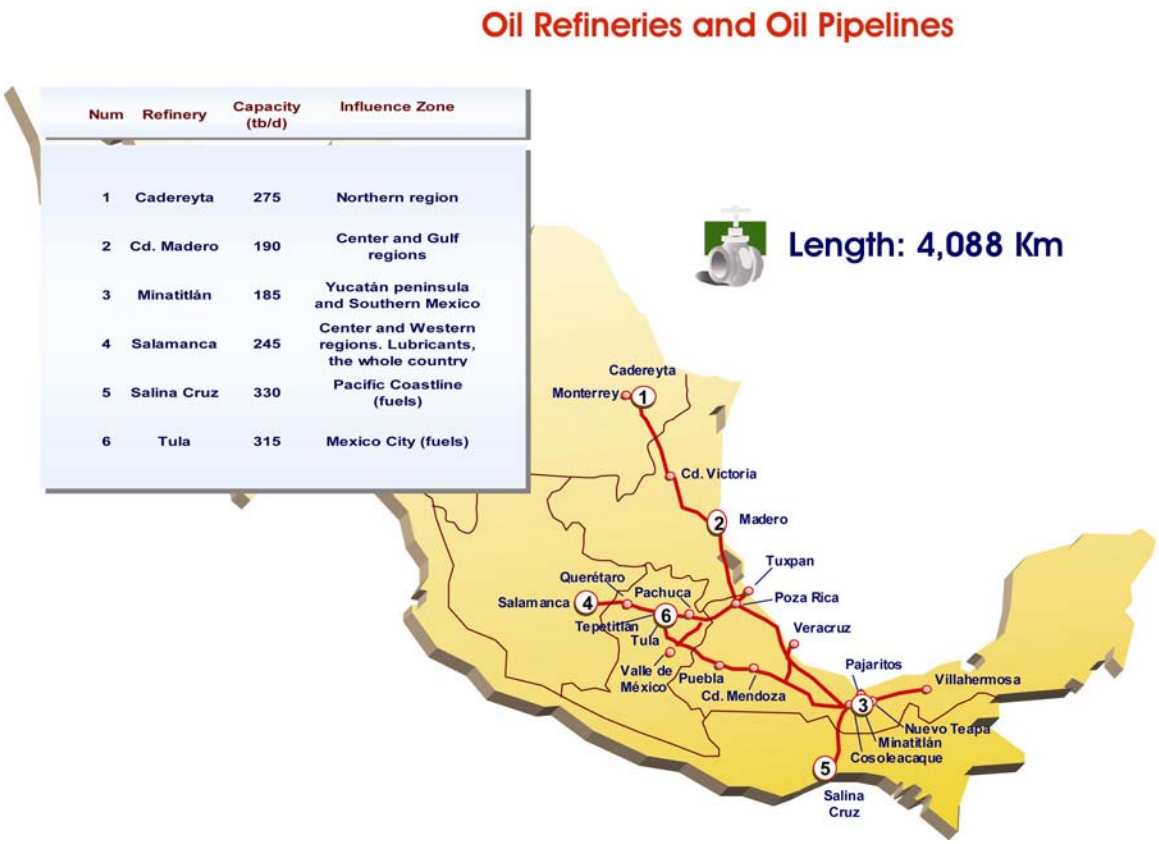


- Canadian and U.S. oil pipeline networks are largely well integrated

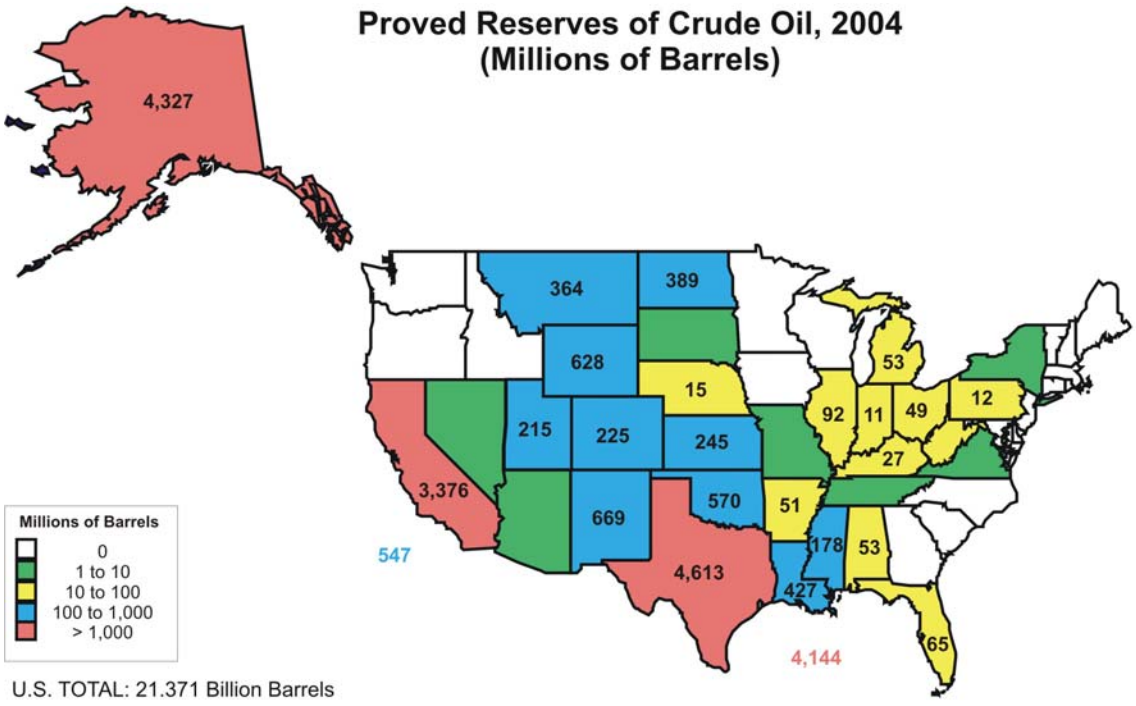
Oil – Mexico


National pipeline system
Length: 8,563 Km
Rosarito
Mexicali
Ensenada
Cd. Juárez
Hermosillo
Guaymas
Cd. Obregón
Chihuahua
Sabinas
Monclova
Topolobampo
Torreón
Reynosa
Matamoros
Cadereyta
Saltillo
Monterrey
La Paz
Culiacán
Cd. Victoria
Mazatlán
Zacatecas
Madero
Aguscalientes
S.L.P.
Progreso
Mérida
Tuxpan
Querétaro
Pachuca
León
Tula
Tuxpan
Poza Rica
El Castillo
Campeche
Lerma
Salamanca
Veracruz
Zamora
Morelia
Puebla
Dos Bocas
Manzanillo
Toluca
Pajaritos
Villahermosa
Valle de México
Cd. Mendoza
Lázaro Cárdenas
Cuernavaca
Minatitlán
Cosoleacaque
Acapulco
Salina Cruz
En construcción

Oil – Mexico


Oil Refineries and Oil Pipelines
Num Refinery Capacity (tb/d) Influence Zone
1 Cadereyta 275 Northern region
2 Cd. Madero 190 Center and Gulf regions
3 Minatitlán 185 Yucatán peninsula and Southern Mexico
4 Salamanca 245 Center and Western regions. Lubricants, the whole country
5 Salina Cruz 330 Pacific Coastline (fuels)
6 Tula 315 Mexico City (fuels)
Length: 4,088 Km
Cadereyta
Monterrey
Cd. Victoria
Madero
Tuxpan
Querétaro
Pachuca
Poza Rica
Salamanca
Tepetitlan
Tula
Veracruz
Valle de México
Puebla
Cd. Mendoza
Pajaritos
Villahermosa
Nuevo Teapa
Minatitlán
Cosoleacaque
Salina Cruz

Oil – United States



- U.S. crude oil reserves are located primarily in Texas, federal offshore, Alaska, and California.

- U.S. oil infrastructure is most developed around these reserve and production centers.

Natural Gas Infrastructure in North America

Natural gas use in North America is growing rapidly. Between 1999 and 2000, Canadian natural gas exports to the United States grew by about 200 billion cubic feet (Bcf). U.S. exports to Canada grew by more than 30 Bcf. Between 1999 and 2000, Mexican natural gas imports from the United States increased by about 40 Bcf. Mexican gas exports to the United States dropped by slightly above 40 Bcf.

The growing role of natural gas has been accompanied by restructuring and regulatory changes that have impacts on infrastructure development.

Key forms of natural gas infrastructure include production, liquefaction or regasification for liquefied natural gas (LNG), storage, and transport (pipelines and tankers). Because of the emerging role of natural gas in many markets, North America's natural gas infrastructure has grown considerably and will continue to grow. Pipelines carry natural gas in both directions between Canada and the United States and between Mexico and the United States. At present most trade of natural gas is from Canada to the United States and from Cook Inlet (Alaska) to Asia. Small quantities of LNG are trucked to Mexico.

At present, the gas pipeline infrastructure is more developed between Canada and the United States than between Mexico and the United States. Canada's gas flows to the United States through several major pipelines feeding U.S. markets in the Midwest, Northeast, the Pacific Northwest, and California. Some key examples are the Alliance Pipeline, the Northern Border Pipeline, the Maritimes & Northeast Pipeline, the Iroquois Pipeline, TransCanada Pipeline System (including Foothills and the Gas Transmission Northwest System, the Duke Energy Gas Transmission (formerly Westcoast Energy) pipelines, and the Northwest Pipelines.

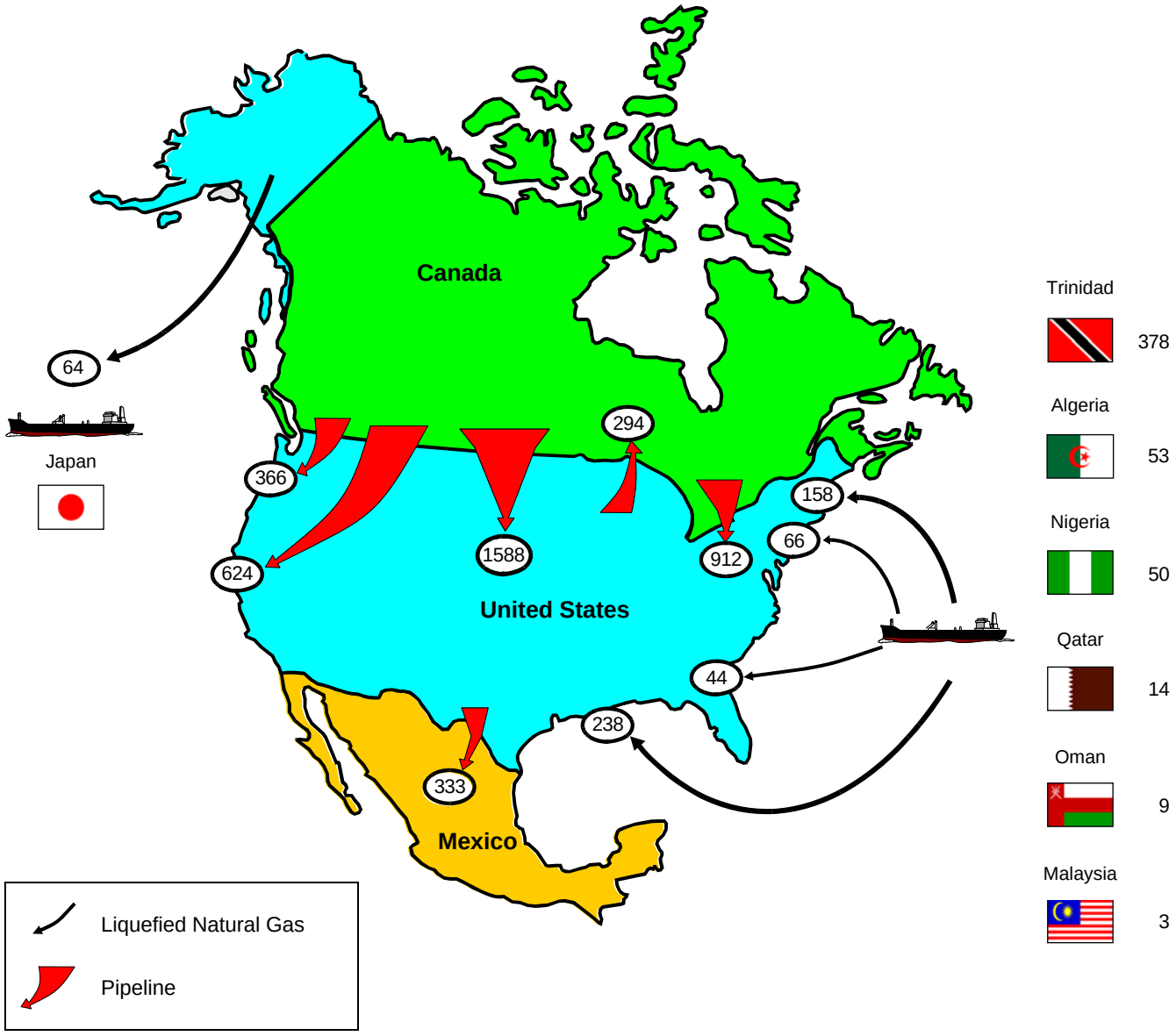
In recent years, the Mexico-United States natural gas pipeline connections have expanded. In 1997, the United States started exporting natural gas through the Texas-to-Monterrey pipeline. In addition, the El Paso Energy connection to Pemex pipelines also contributes to Mexican supplies. Pemex has eight connection stations for exports or imports along the border with the United States. There are other privately owned cross border connections in northwest Mexico.

Natural gas infrastructure in the United States has grown significantly through development of natural gas pipelines and storage capabilities for central national operating centers or "hubs." The Henry Hub in Louisiana has expanded its connections into many gas market centers in Canada and the United States and various trading points that increasingly make use of auction prices rather than long-term contracts.

The expansion of natural gas in North America's economies will continue to focus great importance on investment and development of the infrastructure.

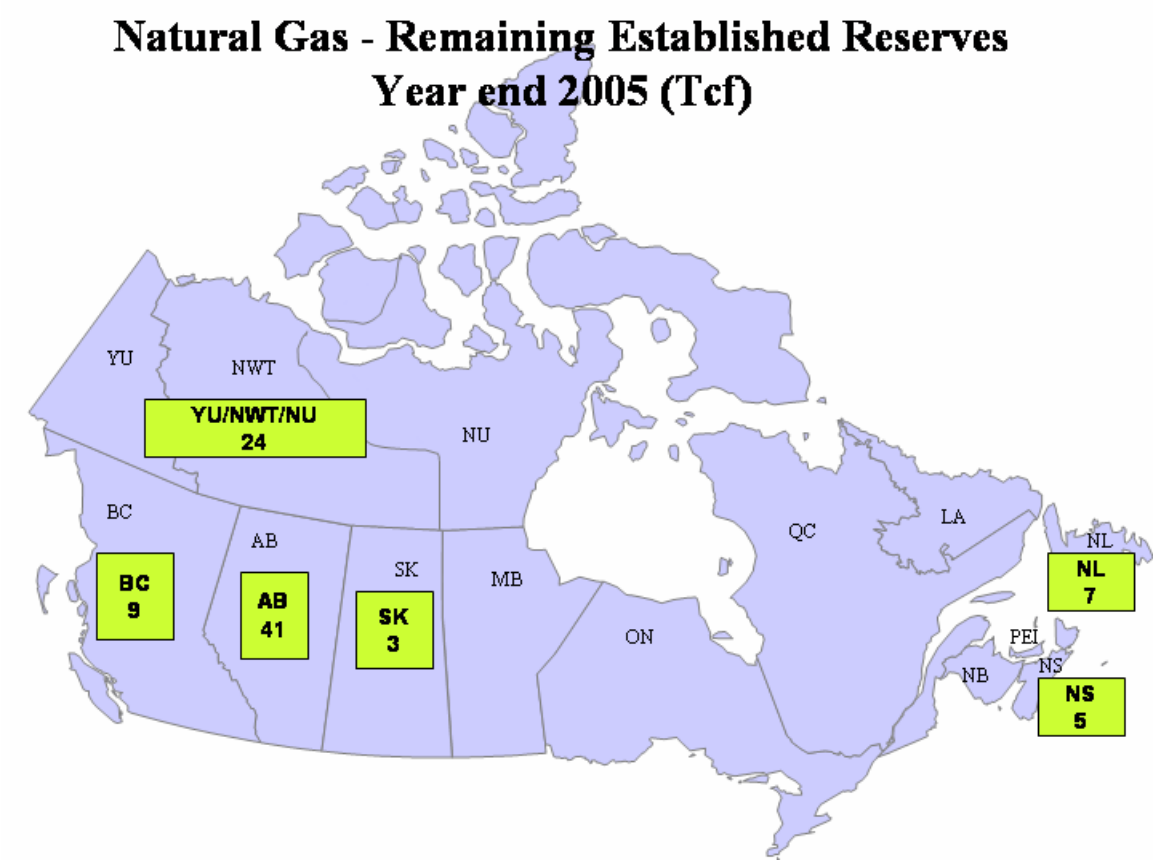
North American Flow of Natural Gas Imports and Exports, 2003

(Billion Cubic Feet)



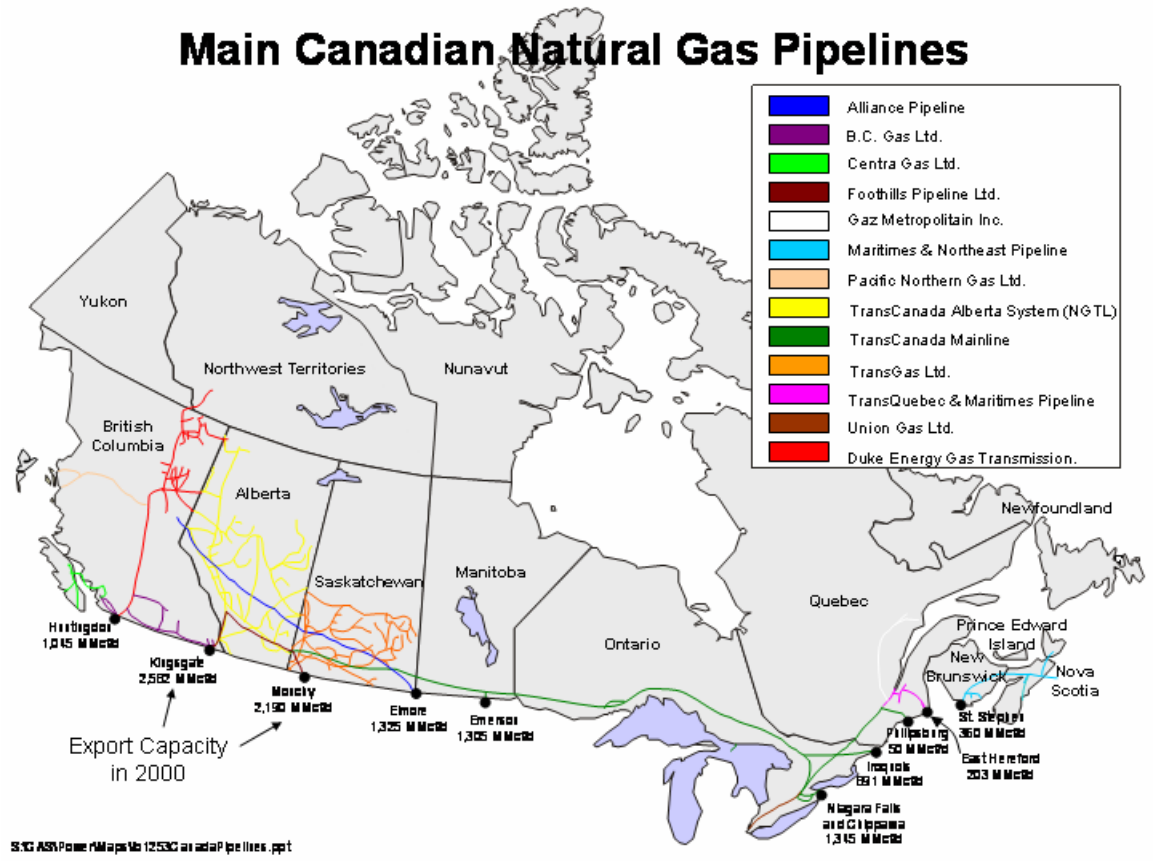
Source: Office of Fossil Energy, U.S. Department of Energy, *Natural Gas Imports and Exports*.

Natural Gas – Canada



- Alberta is the dominant producer.
- There is a high level of interest in northern development.

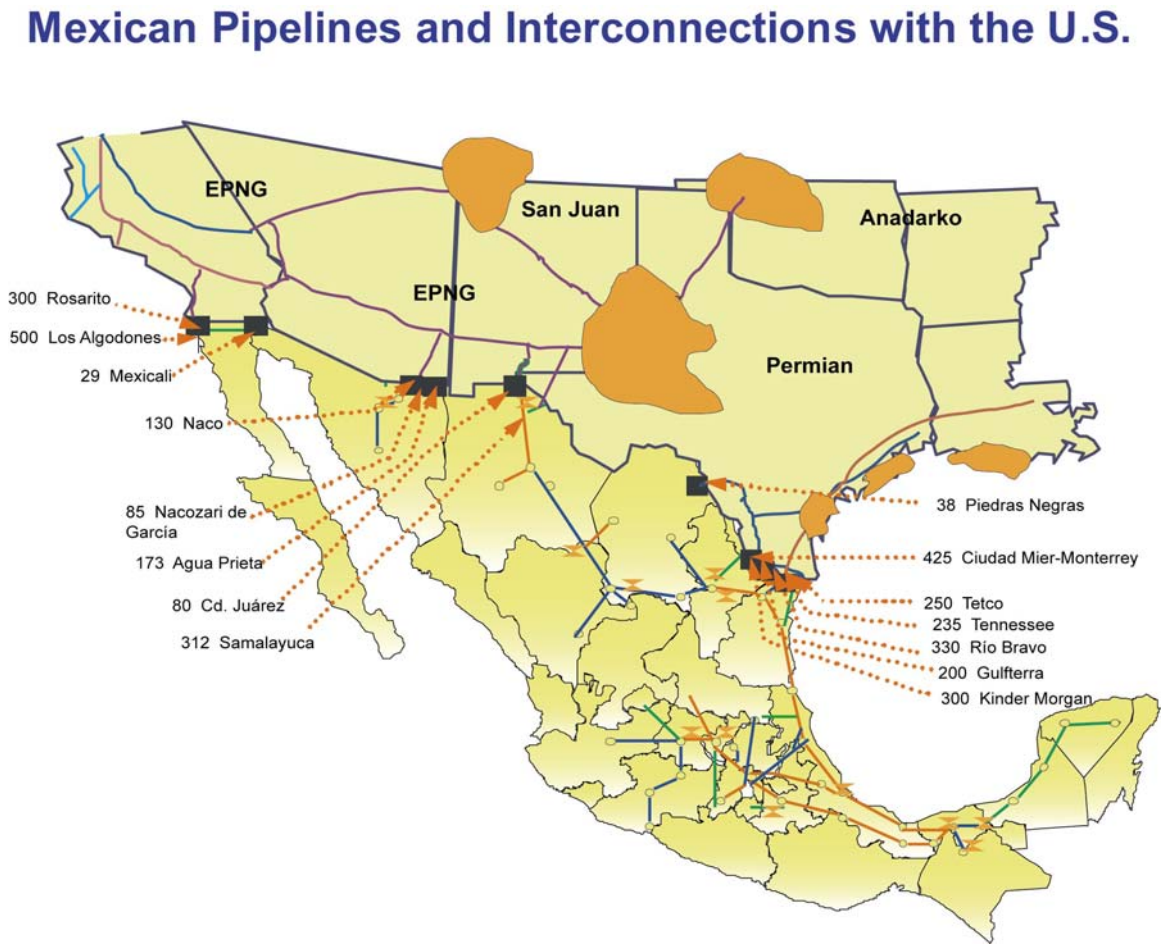
Natural Gas – Canada



- Canada has an extensive natural gas pipeline network, including several major interconnections with the United States.

- Canada is the world's second-largest natural gas exporter after Russia.

Natural Gas – Mexico



Mexico's national pipeline system (with lines of 24, 36 and 48 inches in diameter) crosses 18 states of the Mexican Republic, from Cactus in the south to Los Ramones in the northeast.

- Naco, Sonora, is the point of origin of a 339-kilometer natural gas import pipeline from the United States. This point also has one compression station.

- Mexico's national Pipeline system extends for 8,704 kilometers, with 16 compression stations – five in the south, nine in the north, and two in the central part of the country.

Pemex has seven connection stations where natural gas can be exported or imported along the border with the United States. These stations include: Coahuila; two in Reynosa; two in Argüelles, Tamaulipas; Ciudad Juárez and Samalayuca, Chihuahua; and Ciudad Mier, Tamaulipas.

- Argüelles: The Coral Energy project at Argüelles, inaugurated on October 22, 2000, is an important pipeline crossing the U.S.-Mexican Border. The 24-

inch Coral pipeline has a capacity of 340 million cubic feet per day (MMcf/d) and a length of 95 miles. The new Coral line will serve the same territory as 400 MMcf/d of capacity on Pacific Gas & Electric pipelines, which also connect to the Pemex interconnection at Argüelles, Tamaulipas.

- Reynosa has a combined capacity of 930 MMcf/d: Tetco 250 MMcf/d and Tennessee 350 MMcf/d. The pipeline diameter is 24 inches and runs for 7.5 miles. In 2003, another pipeline was inaugurated in Rio Bravo, with a capacity of 330 MMcf/d.

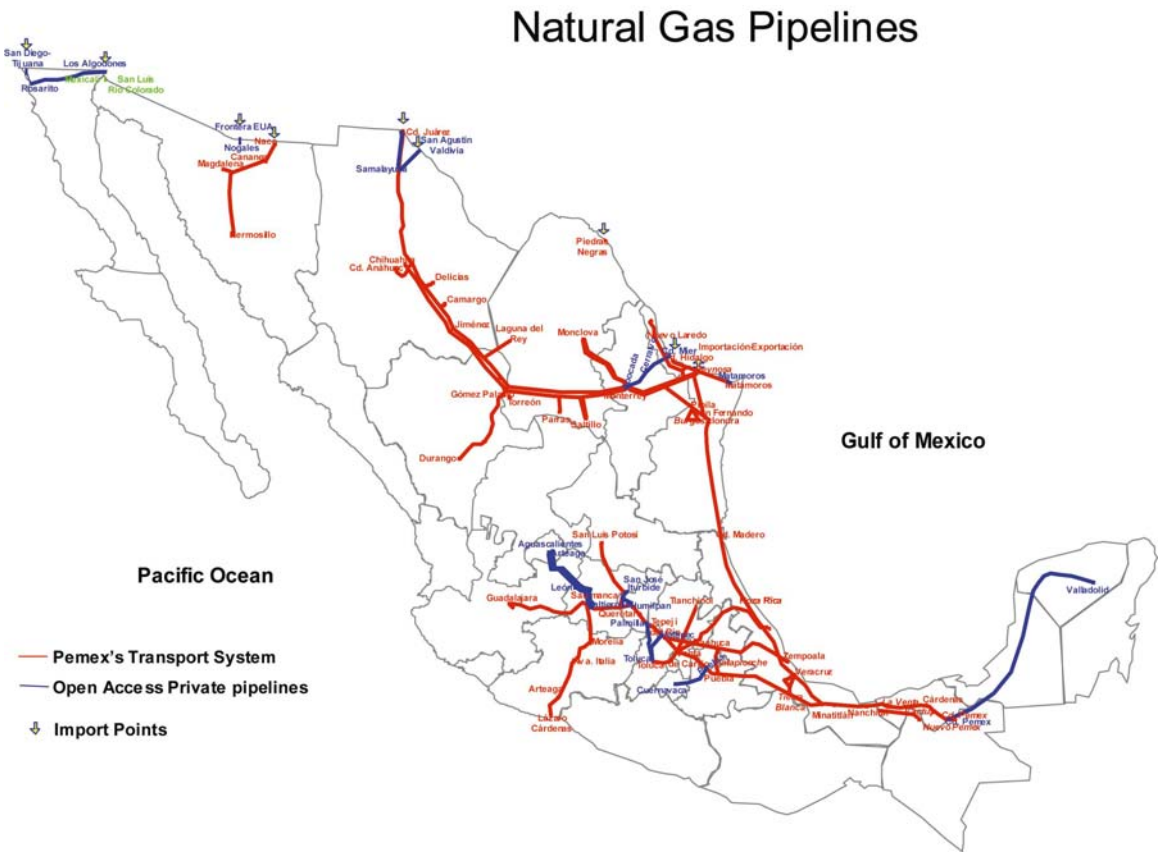
- Ciudad Juárez has 80 MMcf/d capacity, with a pipeline diameter of 16 inches and total length of 2 miles.

- The Samalayuca pipeline is 40 miles long, with a tube of 24 inches in diameter and a capacity of 312 MMcf/d.

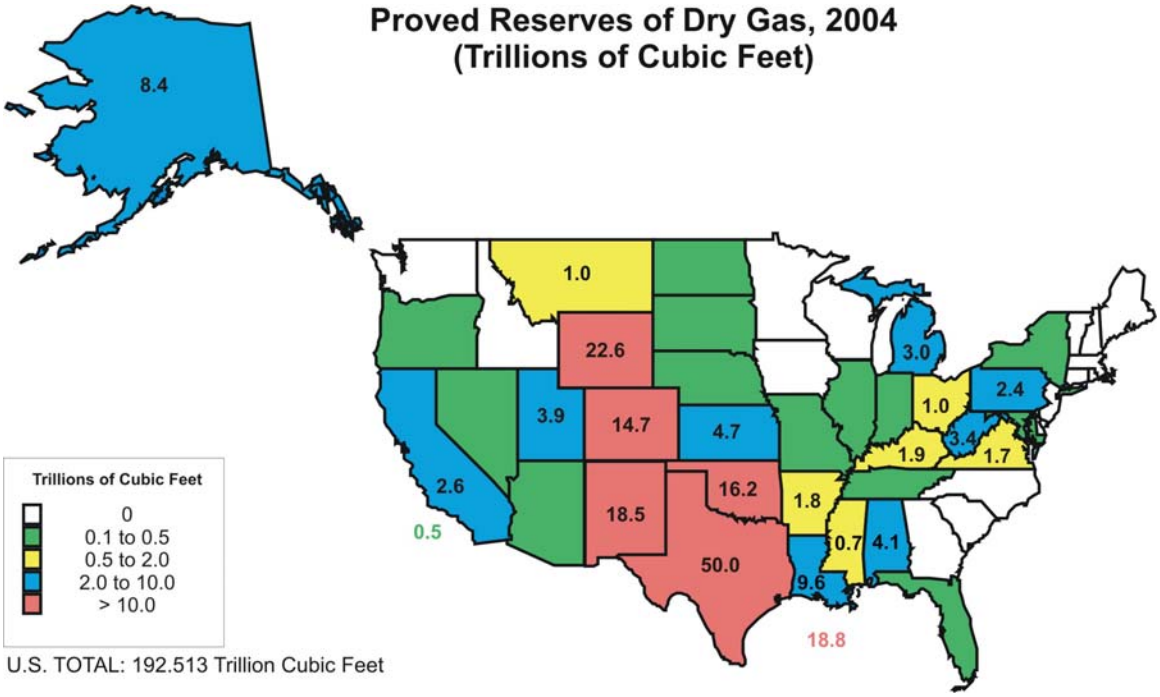
- The Naco pipeline has a capacity of 130 MMcf/d, is two miles long, and has a 16-inch diameter.

- The Piedras Negras has a capacity of 38 MMcf/d.

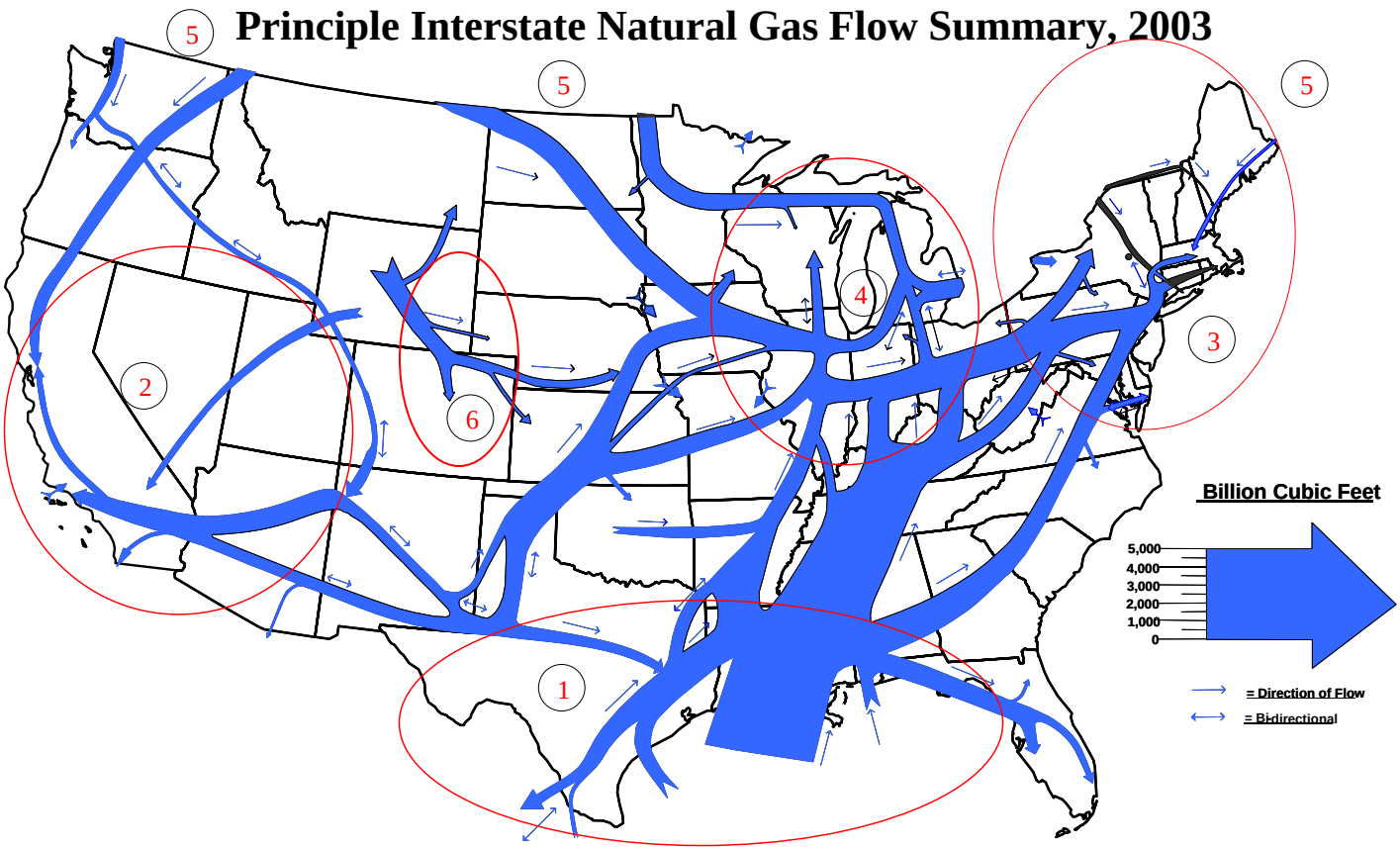
- Mexicali: Another cross-border connection is in northwest Mexico, servicing the Rosarito power plant, industrial facilities and the cities of Tijuana and Mexicali in northern Baja California. It is 36 kilometers long, with a 30-inch diameter and a capacity of 29 MMcf/d. This pipeline is operated by Sempra.


Natural Gas Pipelines
Pacific Ocean
Gulf of Mexico
Pemex's Transport System
Open Access Private pipelines
Import Points

Natural Gas — United States



- The United States has several major natural gas production basins and an extensive natural gas pipeline network.
- There are numerous pipeline connections between the United States and Canada; more than 95 percent of U.S. natural gas imports come from Canada.
- Major connections join Texas and northeastern Mexico, with additional connections to Arizona and between Baja California, Mexico, and California. U.S. Infrastructure growth in the Baja California region is expected.
- U.S. imports from Canada have grown every year since 1986.



A large portion of natural gas pipeline capacity in the United States is directed from the major product areas of Texas and Louisiana (1) to markets in the Northwestern (3) and Midwestern (4) regions of the country. In the past ten years, increasing levels of gas from Canada (5) have targeted these markets as well. Also, production in the Rocky Mountain area (6) serves the Western (2) and Midwestern (4) regions of the country.

Liquefied Natural Gas Infrastructure in North America

The long-term outlook for North America to continue to supply its own natural gas is uncertain. North America accounts for about a quarter of the world's annual natural gas demand, while about 95 percent of the world's proven natural gas reserves are outside North America. Over the last decade, significant technological progress has been made to reduce the liquefaction, shipping and regasification costs of natural gas. When combined with market developments, these efficiency improvements now make liquefied natural gas (LNG) a viable supply option for North American markets.

In order to access LNG in any significant way, North America will need to develop receiving capability in Canada and Mexico, as well as expand the existing capacity in the United States. This will require the construction of considerable infrastructure: docking facilities, LNG storage and regasification facilities, and associated pipelines. In addition, the existing pipeline grid and natural gas storage capabilities may have to be expanded in order to transport this supply to market areas. These infrastructure additions are critical in maintaining North America's ability to access and efficiently trade the necessary amounts of this important source of energy and deliver it to end users.

LNG expansion faces at least two major hurdles. First, many current natural gas sources lack sufficient liquefaction and export facilities. Second, LNG import terminal projects often meet with local public concerns about environmental and safety issues, as well as concerns over the loss of property values. Nevertheless, LNG has been traded and transported internationally since 1959 and has an enviable safety record. LNG is considered a viable supplement to conventional gas production, and opportunities to establish new LNG capabilities and expand existing LNG facilities are being pursued. Each country's efforts are detailed in the LNG country reports following this section.

LNG imports to North America are expected to grow significantly in the coming two decades. In its *International Energy Outlook 2005*, the U.S. Energy Information Administration (EIA) forecasted that U.S. LNG imports will grow to 6.4 trillion cubic feet in 2025.

LNG is expected to play an important role in the North American energy picture, and significant investment is needed to realize this development. Numerous concerns regarding the development of LNG and other pipeline facilities require attention in order to realize the projected sources of natural gas for North America. In support of LNG, as with other energy resources, the SPP strives to achieve transparency of regulations, laws and siting processes in the three countries while enhancing regional trade and investment and mitigating environmental, safety and security concerns.

LNG – Canada

Currently, Canada does not import any LNG. In order to supply natural gas for Canadian needs, as well as to export additional natural gas supplies to the United States, there are seven proposals to construct LNG import facilities in Canada, six of which are at various stages of the environmental assessment (EA)/regulatory review process:

- **WestPac Terminals** (Prince Rupert, British Columbia): Capacity 0.30 billion cubic feet per day (Bcf/d). Project sponsor: WestPac Terminals, Inc. The EA/regulatory review process has not yet begun. Start-up of the facility is targeted for 2009.

- **Kitimat LNG** (Kitimat, British Columbia): Capacity 0.61 Bcf/d. Project sponsor: Galveston LNG. This project is currently under EA/regulatory review. The expected start-up date is 2009.

- **Rabaska project** (Beaumont, Quebec): Capacity 0.50 Bcf/d. Project sponsors: Enbridge, Gaz Métro and Gaz de France. The project is currently under EA/regulatory review with an expected start-up date in 2009.

- **Cacouna Energy project** (Gros Cacouna, Quebec): Capacity 0.50 Bcf/d. Sponsors: TransCanada and Petro-Canada. The EA/regulatory review is underway, with expected start-up in 2009

- **Canaport LNG** (Saint John, New Brunswick): Capacity 1.0 Bcf/d. Project sponsors: Irving Oil, Ltd., and Repsol YPF. Federal and provincial EA approvals were received in August 2004. Construction of the land-based portion of the facility has begun. The sponsors are still seeking LNG supply, but no announcement has been made. The expected start-up date is 2008.

- **Keltic Petrochemicals** (Goldboro, Nova Scotia): Capacity 1.0 Bcf/d. Project sponsor: Keltic Petrochemicals. The project includes a large petrochemical facility and is currently under EA and regulatory review with an expected start-up date in 2009.

- **Bear Head LNG** (Canso Strait, Nova Scotia): Capacity: 1.0 Bcf/d. Project sponsor: Anadarko Petroleum Corp. The project received federal and provincial EA approval in August 2004. Construction began in early 2005. Anadarko is seeking LNG supply, but no announcement has been made. The anticipated start-up date is 2008.

The Quebec LNG projects would provide an alternative source of natural gas supply to markets in eastern Canada, as Quebec is almost entirely dependent on natural gas supply from western Canada. The projects being proposed in British Columbia are largely designed to supply natural gas to consumers on

Vancouver Island and in the Lower Mainland.

While it is difficult to be definitive at this time, it would appear unlikely that all three proposals for the east coast would proceed within the time lines proposed. Similarly, the two projects in Quebec may be mutually exclusive in the short-term, which is not to say that only one would proceed. It is more probable that they would occur sequentially, rather than simultaneously. Before the end of this decade, it appears likely that the North American natural gas supply picture will include one or two Canadian LNG import facilities.

LNG – Mexico

During the next 10 years in Mexico, natural gas demand will grow at a rate of 5.8 percent per year while production is projected to increase from 4.3 billion cubic feet per day (Bcf/d) in 2003 to 5.5 Bcf/d in 2013 at an annual average growth rate of 2.5 percent. Therefore, by 2013 imports will amount to 41 percent of Mexico's total natural gas demand.

In order to increase the supply of natural gas in Mexico, the *Programa Sectorial de Energía 2000-2006*[4] considers the installation of storage and re-gasification LNG terminals in the Gulf of Mexico and Pacific Coasts as an alternative to complement national production and to diversify supply sources at competitive prices.

Over the last 10 years, greater participation by the private sector in the development of infrastructure has been promoted. Furthermore, additions to the existing legal framework regarding the need to ensure security of supply have made the construction of the above-mentioned facilities easier. Large projects have emerged to build re-gasification terminals in Mexico, which seek the diversification of natural gas imports in order to satisfy the Mexican market's demand growth in the short and medium terms. Currently, eight LNG projects are under various states of advanced consideration[5]:

- **Altamira, Tamaulipas:** Capacity: 0.50 Bcf/d. Project sponsor: *Terminal de GNL de Altamira, S. de R.L. de C.V.* (Shell). The start up date is planned for the end of 2006 and the terminal is in an advanced stage of construction. The *Comisión Federal de Electricidad* (CFE)[6] will consume the entire gas supply, which will come from Nigeria and Trinidad and Tobago.

- **Ensenada, Baja California:** Capacity: 1.0 Bcf/d. Project sponsor: *Energía Costa Azul, S. de R.L. de C.V.* (Sempra-Shell). The project is scheduled to begin operation in 2008 and envisages

[4] Federal Government's Energy Sector Program 2000-2006.

[5] There exists no official endorsement from the federal government for the potential projects listed here. This listing is based on public information available to the Energy Secretariat through the potential sponsors, media and local authorities.

[6] The federal state-owned power utility.

supply the power, industrial and residential sectors, as well as exports to Arizona. The gas will come from Indonesia and, possibly, Russia. Currently, the facility is under construction.

- **Coronado Islands:** Capacity: 0.70 Bcf/d. Project sponsor: *Chevron Texaco de México, S.A. de C.V.* The *Comisión Reguladora de Energía* (CRE)[7] awarded a permit for the construction of the first Mexican offshore terminal. Chevron Texaco estimates the facility will start operations around 2008; however, its construction has not started yet.

- **Manzanillo:** Capacity: 1.0 Bcf/d. CFE sponsors the project and its main purpose is to meet the demand for future power generation within the region. It is estimated that it will begin to operate in 2010-2011.

- **Lázaro Cárdenas:** Capacity: 0.50 Bcf/d. Project sponsor: Repsol YPF. The sponsor has won the right to construct an LNG terminal at Lázaro Cardenas, but the CRE has not awarded a permit yet.

- **Topolobampo:** Capacity: 0.50 Bcf/d. The project is under early stages of evaluation. Local and port authorities are promoting a bid for the right to establish an LNG terminal on port grounds.

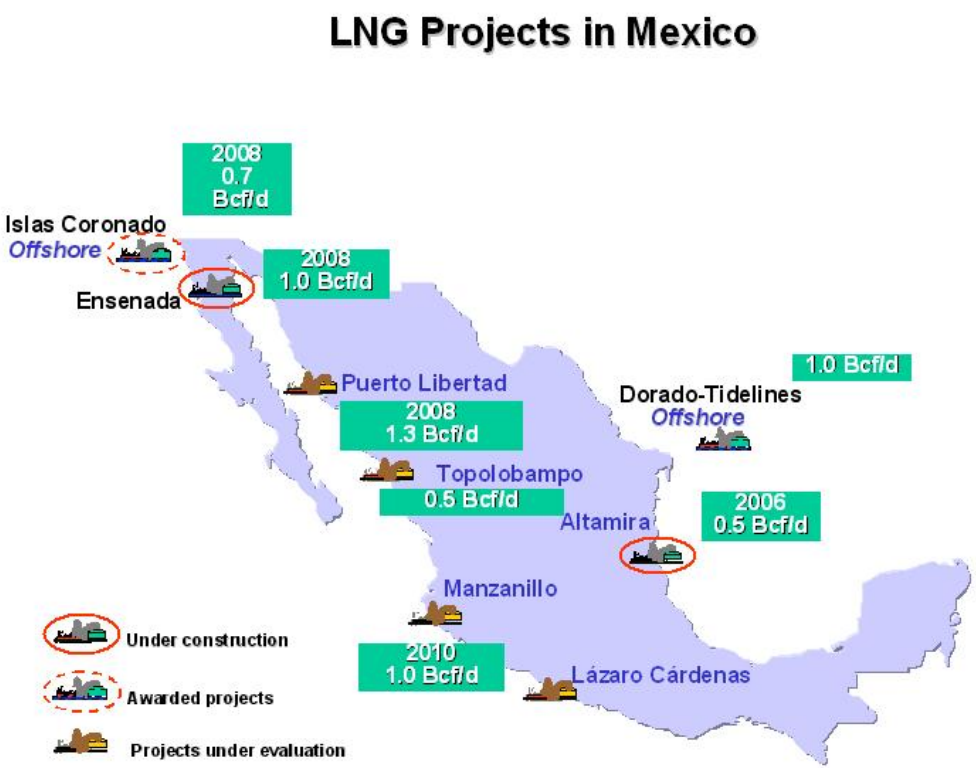
- **Offshore Gulf of Mexico:** Capacity: 1.0 Bcf/d. Project sponsor: Dorado-Tidelands (*Terranova Energía*). The sponsor recently solicited an open access transport permit. It is expected that this transport system will be interconnected to the future Gulf of Mexico's offshore LNG terminal.

- **Puerto Libertad:** Capacity: 1.3 Bcf/d. Project sponsor: Sonora Pacific LNG. This project has not yet been awarded a permit, but the sponsor originally scheduled its beginning of operations around 2009.

In Mexico, LNG projects are mainly associated with the power sector's expansion plans, which will use natural gas-fueled combined-cycle plants. Given that LNG projects need substantial capital investment, CFE is the consumer most capable to anchor a project of this magnitude. The possibility of partnerships between CFE, *Petróleos Mexicanos* (Pemex) and private companies for the development of LNG terminals is being considered.

The benefits derived from encouraging the construction of LNG terminals are well identified by the federal government and are part of its strategy of increasing natural gas supply.

[7] Mexico's Energy Regulatory Commission.



Note: Date reflects expected start of operation. Volume is either the one approved in the permit application or the expected volume for the project. *Source: Mexico's Energy Secretariat.*

LNG – United States

Liquefied natural gas (LNG) imports accounted for almost 3 percent of U.S. natural gas supply in 2004. However, concerns over flattening and perhaps even declining gas production in the United States and Canada – the largest supplier of imported natural gas to the United States – is prompting a growing interest in the increased use of LNG.

U.S. LNG imports have already increased to meet rising demand, with recent years seeing a dramatic increase from 85 billion cubic feet (Bcf) in 1998 to 652 Bcf in 2004. They are expected to continue to increase to even greater levels in the near future and will be of particular importance in providing gas to meet the needs of the supply-constrained areas of the United States.

As in the rest of North America, the expansion and development of LNG facilities in the U.S. can appear daunting. Federal agency approvals of LNG terminals can be overridden by state decisions pursuant to the federal powers delegated to them under the Coastal Zone Management Act, the Clean Air Act, and the Clean Water Act, as well as other authorities designated to other federal agencies. In addition, other state permits (e.g., shoreline management and zoning) can be used to deter LNG project developments.

Despite these impediments, the United States is proceeding to increase its LNG capacity. The Energy Policy Act of 2005 (EPAct 2005), signed by President George W. Bush on August 8, 2005, amended Section 3 of the Natural Gas Act and provides the Federal Energy Regulatory Commission (FERC or the Commission) with exclusive jurisdiction to approve applications for the siting, construction, expansion, or operation of an LNG terminal.[8] The energy bill also codifies the FERC's 2002 Hackberry decision, which gave LNG terminal owners flexibility in allowing access to the terminal capacity and in the pricing of the services rendered.

Currently, the United States has about 4.4 billion cubic feet per day (Bcf/d) of deliverability from five LNG terminals that bring gas into the lower 48 states. This import capacity includes the new Gulf Gateway offshore terminal 116 miles from the Louisiana coast that commenced service in March 2005. (There is also an LNG terminal in Alaska used for exports to Japan.) FERC has approved another 12 Bcf/d of deliverability at eight new terminals and expansions totaling 1.1 Bcf/d at two existing terminals. In addition, FERC has also approved two projects totaling 1.7 Bcf/d of pipeline capacity that would transport Bahamian LNG to Florida. The Coast Guard and Maritimes Administration have approved, in addition to the Gulf Gateway terminal, two other offshore terminals that fall under its jurisdiction with a combined deliverability of 2.6 Bcf/d. All told, 17.4 Bcf/d of deliverability has been approved for new and existing LNG terminals and pipelines.

These authorizations offer no guarantee that all of the facilities will be constructed. While regulatory approval is a major step for the project sponsor, it neither assures financing nor the execution of contracts for the capacity of the LNG facility. The U.S. regulatory approval process does not advocate or promote individual projects; it merely processes the proposals in the most expeditious fashion possible and allows free market forces to ultimately decide the facilities that will be built.

With the need for more natural gas in the United States, LNG deliveries are expected to increase in the future, given sufficient price considerations. The National Petroleum Council's September 2003 report estimates that LNG could increase from about 3 percent now to as much as 12 percent of the U.S. gas supply by 2025. The Energy Information Administration's (EIA) *Annual Energy Outlook 2005* estimates that LNG could account for as much as 21 percent of the total U.S. natural gas supply in 2025, or about 17.5 Bcf/d.

Depending on the location of the facility, site-approval jurisdiction falls either to FERC or the Maritimes Administration/Coast Guard. New LNG terminals that have been approved by either FERC or the Maritimes Administration/Coast Guard include:

FERC APPROVAL

- **Cameron LNG (Hackberry, LA):** Capacity: 1.5 Bcf/d. Project sponsor: Sempra Energy. This terminal was approved in

[8] Energy Policy Act of 2005, Conference Report, Title III – Oil and Gas, Subtitle B – Natural Gas, Section 311.

September 2003, with construction to begin by the end of 2005. It will be able to store 10.6 Bcf.

- **Freeport LNG (Freeport, TX):** Capacity: 1.5 Bcf/d. A consortium of general and limited partners, including Cheniere Energy, among others, received authorization in June 2004 and commenced construction in March 2005. The initial authorization approved a storage capacity of 7 Bcf. Freeport recently filed to increase the delivery capacity by 2.5 Bcf/d and to increase the storage capacity by 3.5 Bcf.

- **Sabine Pass LNG (Sabine, LA):** Capacity: 2.6 Bcf/d. Project sponsor: Cheniere Energy. The facility received authorization in December 2004 and commenced construction in March 2005. The terminal will have the capacity to store 10.4 Bcf. Sabine Pass recently applied to increase its capacity by 1.4 Bcf/d to 4.0 Bcf/d and to construct an additional 10.4 Bcf of storage.

- **Corpus Christi LNG (Corpus Christi, TX):** Capacity: 2.6 Bcf/d. Project sponsor: Cheniere Energy. Construction was authorized in April 2005. The terminal will store 10.4 Bcf.

- **Vista del Sol LNG (Corpus Christi, TX):** Capacity: 1.1 Bcf/d. Project sponsor: ExxonMobil. The company received authorization to construct this terminal in June 2005. It is designed to store 9.8 Bcf.

- **Weaver's Cove Energy (Fall River, MA):** Capacity: 0.8 Bcf/d. Project sponsors: Poten and Partners and Amerada Hess. FERC authorized construction of this terminal in June 2005. The storage capacity will total 4.4 Bcf.

- **Golden Pass LNG (Sabine, TX):** Capacity: 1.0 Bcf/d. Project sponsor: ExxonMobil. The facility received construction authorization in July 2005. It is designed to store 16.4 Bcf. ExxonMobil intends to expand the facility so that it will have a total capacity of 2.0 Bcf/d.

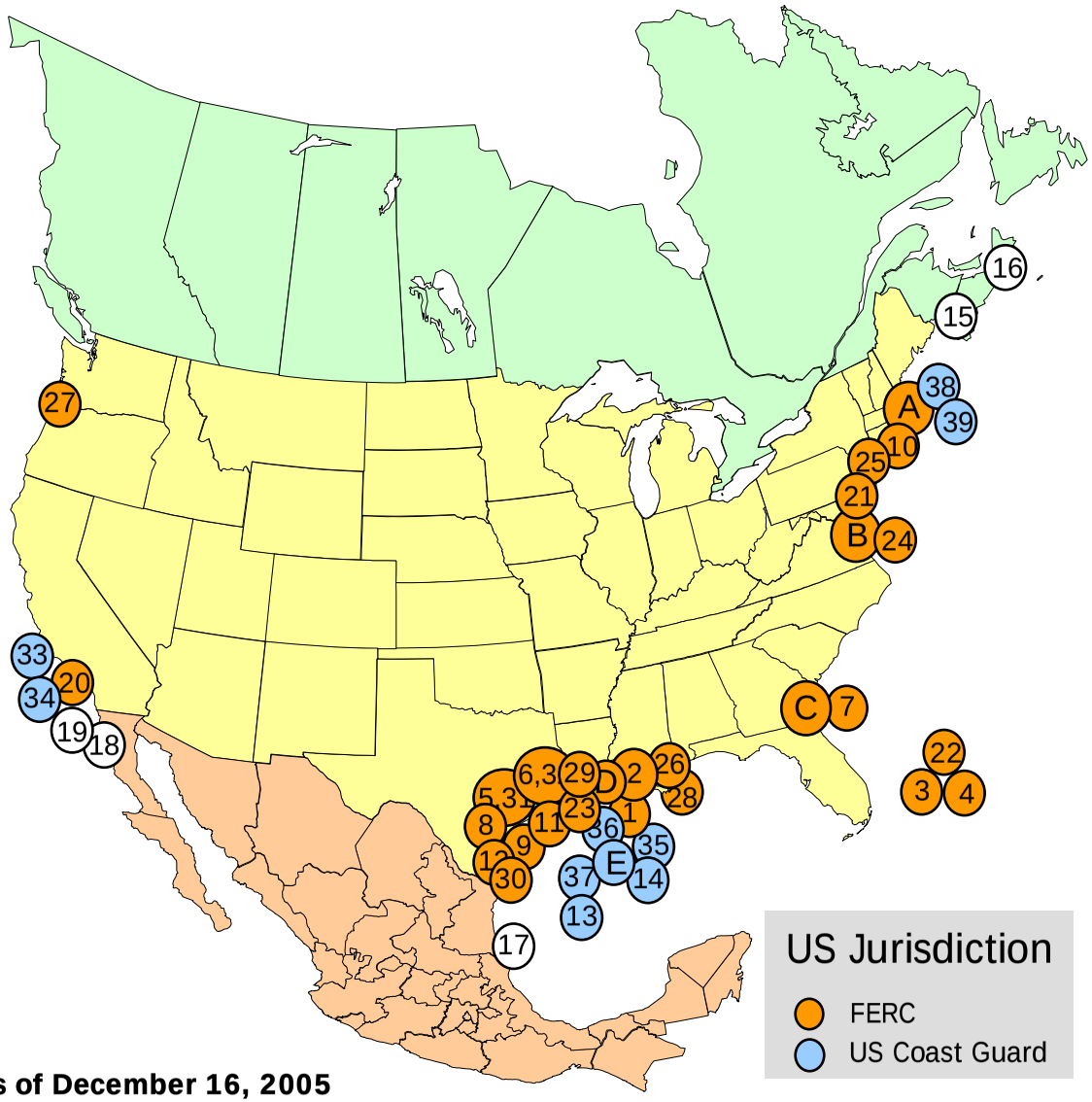
- **Ingleside Energy (Corpus Christi, TX):** Capacity: 1.0 Bcf/d. Project sponsor: Occidental Energy. The proposed LNG facility was approved in July 2005. The terminal will be able to store 6.8 Bcf.

COAST GUARD/MARITIMES ADMINISTRATION APPROVAL

- **Port Pelican (Offshore LA):** Capacity: 1.6 Bcf/d. Project sponsor: Chevron. The site received authorization in March 2004. Chevron has announced its intention to defer construction indefinitely.

- **Gulf Landing LNG (Offshore LA):** Capacity: 1.0 Bcf/d. Project sponsor: Shell. The facility received authorization in February 2005.

Existing and Proposed North American LNG Terminals



As of December 16, 2005

* *US pipeline approved; LNG terminal pending in Bahamas*

Source: U.S. Federal Energy Regulatory Commission

CONSTRUCTED

A. Everett, MA : 1.035 Bcfd (Tractebel - DOMAC)
B. Cove Point, MD : 1.0 Bcfd (Dominion - Cove Point LNG)
C. Elba Island, GA : 0.68 Bcfd (El Paso - Southern LNG)
D. Lake Charles, LA : 1.2 Bcfd (Southern Union - Trunkline LNG)
E. Gulf of Mexico: 0.5 Bcfd, (Gulf Gateway Energy Bridge - Excelerate Energy)

APPROVED BY FERC

1. Lake Charles, LA: 0.6 Bcfd (Southern Union - Trunkline LNG)
2. Hackberry, LA : 1.5 Bcfd, (Sempra Energy)
3. Bahamas : 0.84 Bcfd, (AES Ocean Express)*
4. Bahamas : 0.83 Bcfd, (Calypso Tractebel)*
5. Freeport, TX : 1.5 Bcfd, (Cheniere/Freeport LNG Dev.)
6. Sabine, LA : 2.6 Bcfd (Cheniere LNG)
7. Elba Island, GA: 0.54 Bcfd (El Paso - Southern LNG)
8. Corpus Christi, TX: 2.6 Bcfd, (Cheniere LNG)
9. Corpus Christi, TX : 1.0 Bcfd (Vista Del Sol - ExxonMobil)
10. Fall River, MA : 0.8 Bcfd, (Weaver's Cove Energy/Hess LNG)
11. Sabine, TX : 1.0 Bcfd (Golden Pass - ExxonMobil)
12. Corpus Christi, TX: 1.0 Bcfd (Ingleside Energy - Occidental Energy Ventures)

APPROVED BY MARAD/COAST GUARD

13. Port Pelican: 1.6 Bcfd, (Chevron Texaco)
14. Louisiana Offshore : 1.0 Bcfd (Gulf Landing - Shell)

CANADIAN APPROVED TERMINALS

15. St. John, NB : 1.0 Bcfd, (Canaport - Irving Oil)
16. Point Tupper, NS 1.0 Bcf/d (Bear Head LNG - Anadarko)

MEXICAN APPROVED TERMINALS

17. Altamira, Tamulipas : 0.7 Bcfd, (Shell/Total/Mitsui)
18. Baja California, MX : 1.0 Bcfd, (Sempra)
19. Baja California - Offshore : 1.4 Bcfd, (Chevron Texaco)

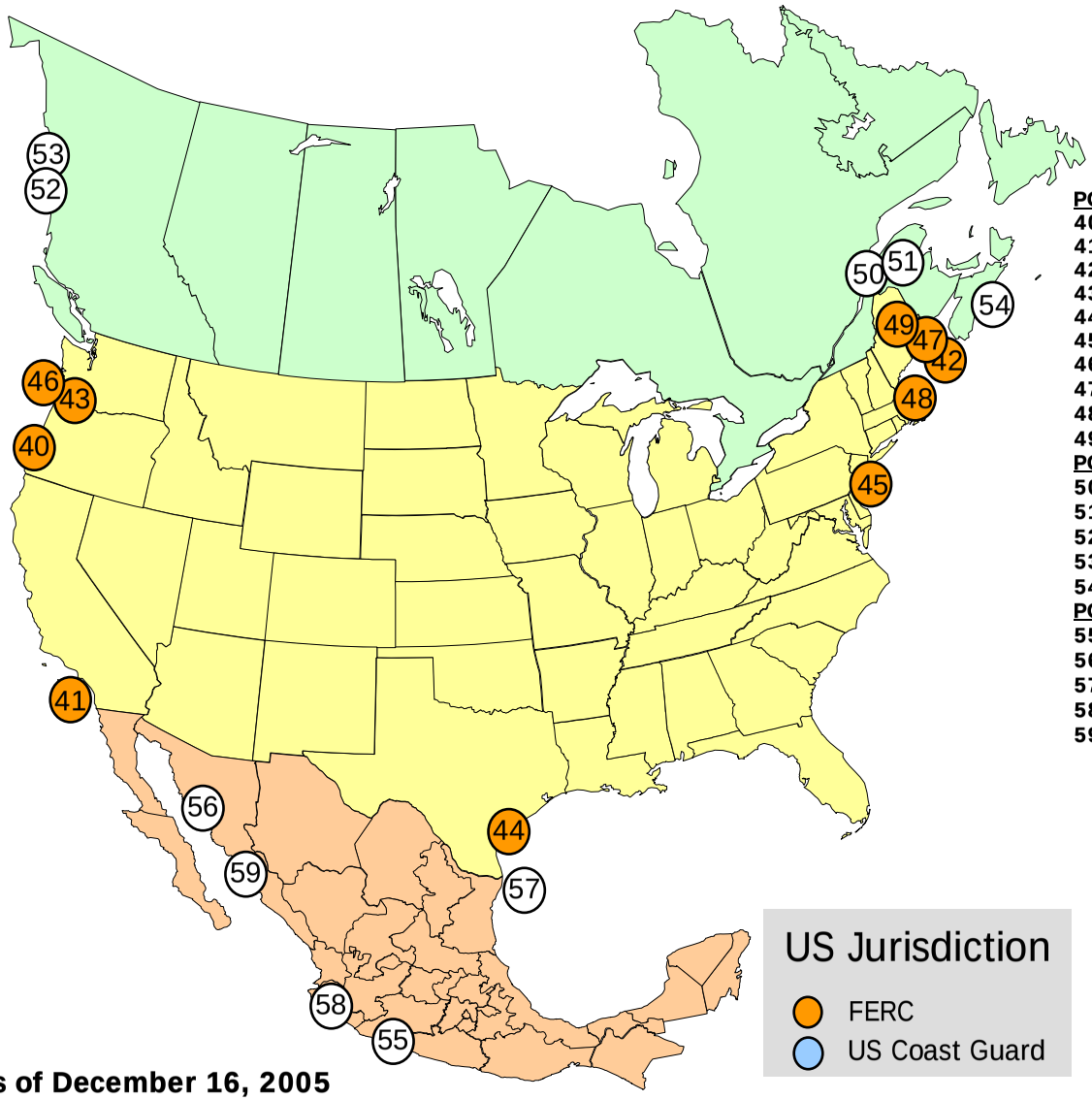
PROPOSED TO FERC

20. Long Beach, CA : 0.7 Bcfd, (Mitsubishi/ConocoPhillips - Sound Energy Solutions)
21. Logan Township, NJ : 1.2 Bcfd (Crown Landing LNG - BP)
22. Bahamas : 0.5 Bcfd, (Seafarer - El Paso/FPL)
23. Port Arthur, TX: 1.5 Bcfd (Sempra)
24. Cove Point, MD : 0.8 Bcfd (Dominion)
25. LI Sound, NY: 1.0 Bcfd (Broadwater Energy - TransCanada/Shell)
26. Pascagoula, MS: 1.0 Bcfd (Gulf LNG Energy LLC)
27. Bradwood, OR: 1.0 Bcfd (Northern Star LNG - Northern Star Natural Gas LLC)
28. Pascagoula, MS: 1.3 Bcfd (Casotte Landing - ChevronTexaco)
29. Cameron, LA: 3.3 Bcfd (Creole Trail LNG - Cheniere LNG)
30. Port Lavaca, TX: 1.0 Bcfd (Calhoun LNG - Gulf Coast LNG Partners)
31. Freeport, TX: 2.5 Bcfd (Cheniere/Freeport LNG Dev. - Expansion)
32. Sabine, LA: 1.4 Bcfd (Cheniere LNG - Expansion)

PROPOSED TO MARAD/COAST GUARD

33. California Offshore: 1.5 Bcfd (Cabrillo Port - BHP Billiton)
34. So. California Offshore : 0.5 Bcfd, (Crystal Energy)
35. Louisiana Offshore : 1.0 Bcfd (Main Pass McMoRan Exp.)
36. Gulf of Mexico: 2.8 Bcfd (Pearl Crossing - ExxonMobil)
37. Gulf of Mexico: 1.5 Bcfd (Beacon Port Clean Energy Terminal **-** ConocoPhillips)
38. Offshore Boston, MA: 0.4 Bcfd (Neptune LNG - Tractebel)
39. Offshore Boston, MA: 0.8 Bcfd (Northeast Gateway - Excelerate Energy)

Potential North American LNG Terminals



POTENTIAL U.S. SITES IDENTIFIED BY PROJECT SPONSORS

40. Coos Bay, OR: 0.13 Bcfd, (Energy Projects Development)
41. California - Offshore: 0.75 Bcfd, (Chevron Texaco)
42. Pleasant Point, ME : 0.5 Bcfd (Quoddy Bay, LLC)
43. St. Helens, OR: 0.7 Bcfd (Port Westward LNG LLC)
44. Galveston, TX: 1.2 Bcfd (Pelican Island - BP)
45. Philadelphia, PA: 0.6 Bcfd (Freedom Energy Center - PGW)
46. Astoria, OR: 1.0 Bcfd (Skipanon LNG - Calpine)
47. Robbinston, ME: 0.5 Bcfd (Downeast LNG - Kestrel Energy/Dean Girdis)
48. Boston, MA: 0.8 Bcfd (AES Battery Rock LLC - AES Corp.)
49. Calais, ME: ? Bcfd (BP Consulting LLC)

POTENTIAL CANADIAN SITES IDENTIFIED BY PROJECT SPONSORS

50. Quebec City, QC : 0.5 Bcfd (Project Rabaska - Enbridge/Gaz Met/Gaz de France)
51. Rivière-du- Loup, QC: 0.5 Bcfd (Cacouna Energy - TransCanada/PetroCanada)
52. Kitimat, BC: 0.61 Bcfd (Galveston LNG)
53. Prince Rupert, BC: 0.30 Bcfd (WestPac Terminals)
54. Goldboro, NS 1.0 Bcfd (Keltic Petrochemicals)

POTENTIAL MEXICAN SITES IDENTIFIED BY PROJECT SPONSORS

55. Lázaro Cárdenas, MX : 0.5 Bcfd (Tractebel/Repsol)
56. Puerto Libertad, MX: 1.3 Bcfd (Sonora Pacific LNG)
57. Offshore Gulf, MX: 1.0 Bcfd (Dorado - Tidelands)
58. Manzanillo, MX: 0.5 Bcfd
59. Topolobampo, MX: 0.5 Bcfd

As of December 16, 2005
Source: U.S. Federal Energy Regulatory Commission

Coal Infrastructure in North America

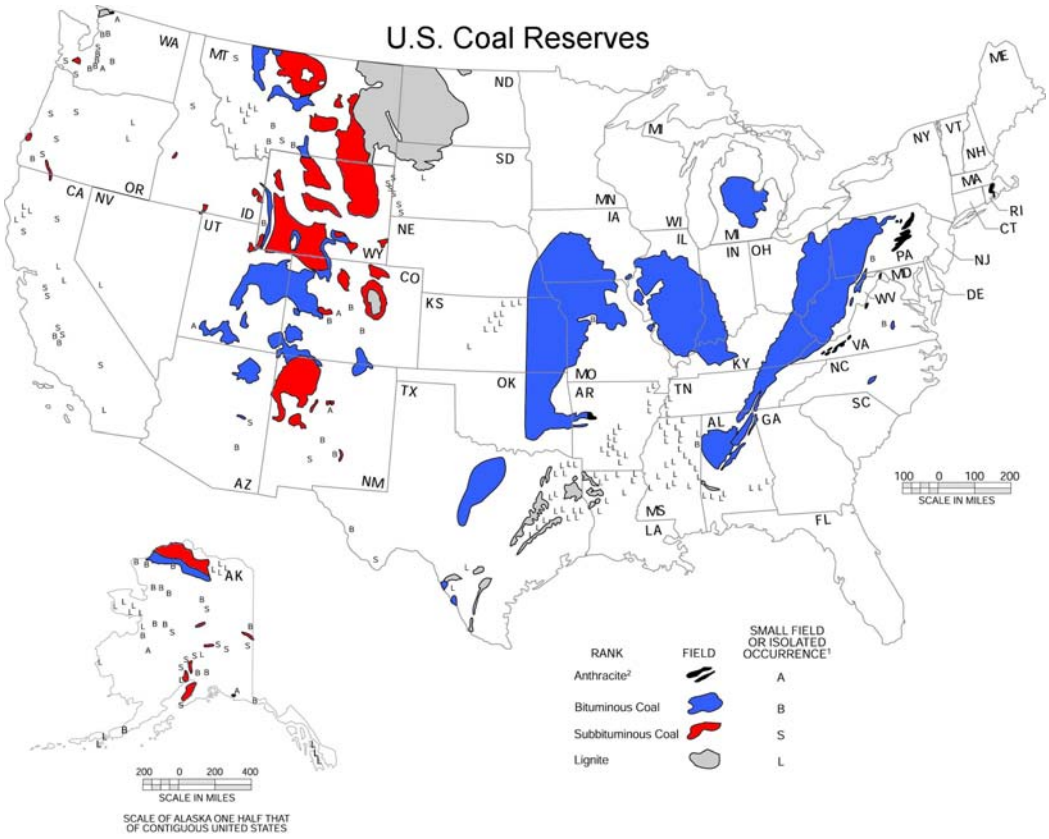
Coal is a relatively plentiful fuel in the world and can face constraints due to insufficient access to infrastructure providing competitive costs for handling and delivery. Accessing coal supplies requires structures for mining, preparation, delivery, and storage. Most coal travels by rail, barge, and ship. Coal is used primarily for electricity generation and for metallurgy (steel production).

Canada's coal production is used mostly for electricity generation and some exports of metallurgical coal. Canada also uses U.S. coal and is the principal export market for United States. Most of Canada's coal is produced and consumed in Alberta and Saskatchewan. Some thermal coal is transported long distances by rail to Ontario.

Mexico produces small quantities of coal but does not rely much on coal as a fuel. Small quantities of coal are also imported from Canada and the United States. About a tenth of Mexico's electricity generation is from coal-fired plants.

The United States is a major international coal producer and consumer. Consequently, the United States has major infrastructure requirements in every phase of coal production and use.

Coal – United States



- The three largest coal-producing States are Wyoming, West Virginia and Kentucky. Texas and Pennsylvania are also major producers.

- Eleven other states also are significant coal producers: Alabama, Arizona, Colorado, Illinois, Indiana, Montana, North Dakota, New Mexico, Ohio, Utah, and Virginia.

- Coal is transported mainly by rail.

Electricity Infrastructure in North America

The vital role of electricity for every business and household makes its infrastructure a primary concern for North America. As economies grow, the need for electricity grows. There is a continual need for new investment for plant development, transmission and distribution. In addition, the industry is introducing new types of generating equipment – most notably combined-cycle combustion units. This new equipment can use oil or gas but primarily uses natural gas. The development of economical clean-coal technologies could offer enhancement of coal use in electricity generation.

Canada trades significant quantities of electricity with the United States. Quebec is a major exporter to the northeast United States. Quebec and Newfoundland & Labrador plan to make important expansions in electricity generating capacity.

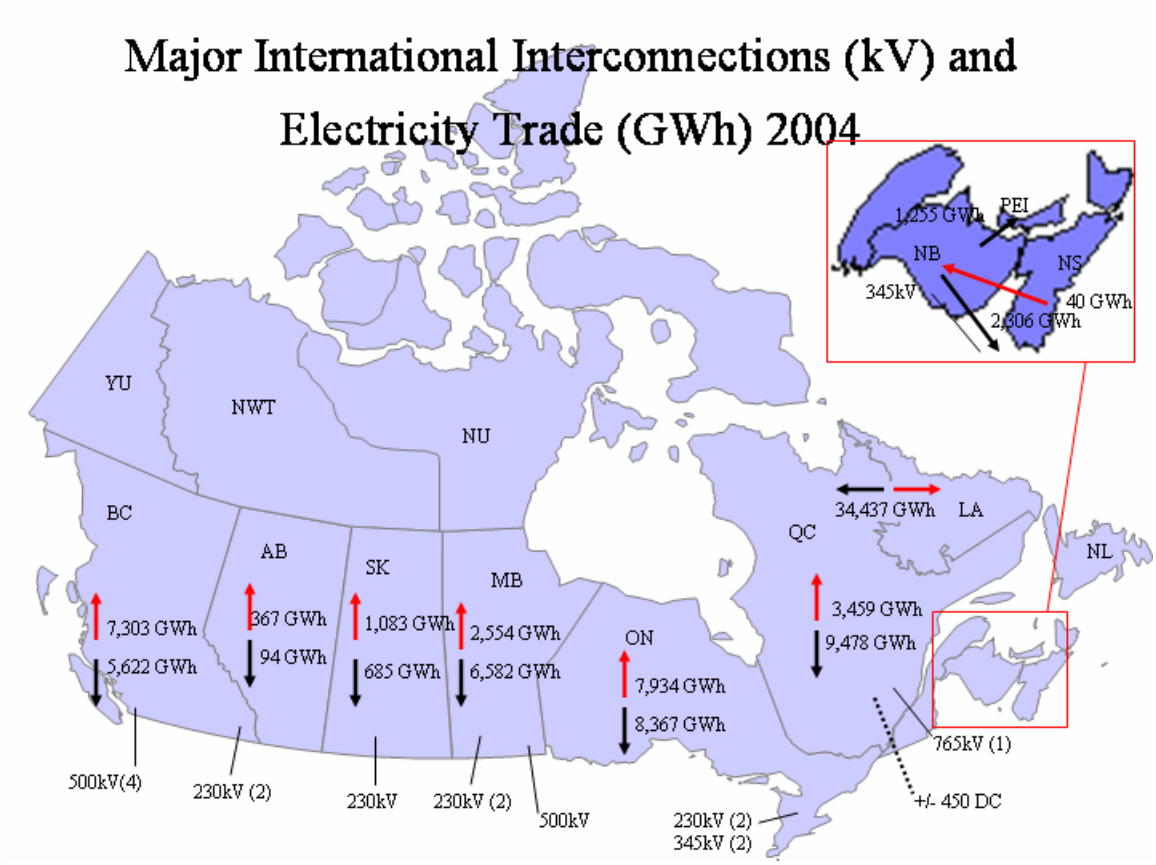
Most electricity generation in Mexico comes from thermal power plants – many in the area of Mexico City. Mexico is a net importer of electricity from the United States. Mexico's border areas receive electricity from the north in emergencies.

The United States has electricity trade with Canada and Mexico at many points stretching from Maine to Washington and from Texas to California. In addition, northwestern hydropower capability partially depends on the water supply that originates in Canada.

Reliability of supply is a major concern for each country in North America and has important implications for future development of infrastructure. The North American Electricity Reliability Council (NERC) is working in Canada and the United States on electric system reliability standards and wholesale business practice standards. NERC is a voluntary organization that has 8 regional councils that account for almost all electricity supplied within Canada, the United States, and a portion of Baja California Norte in Mexico.

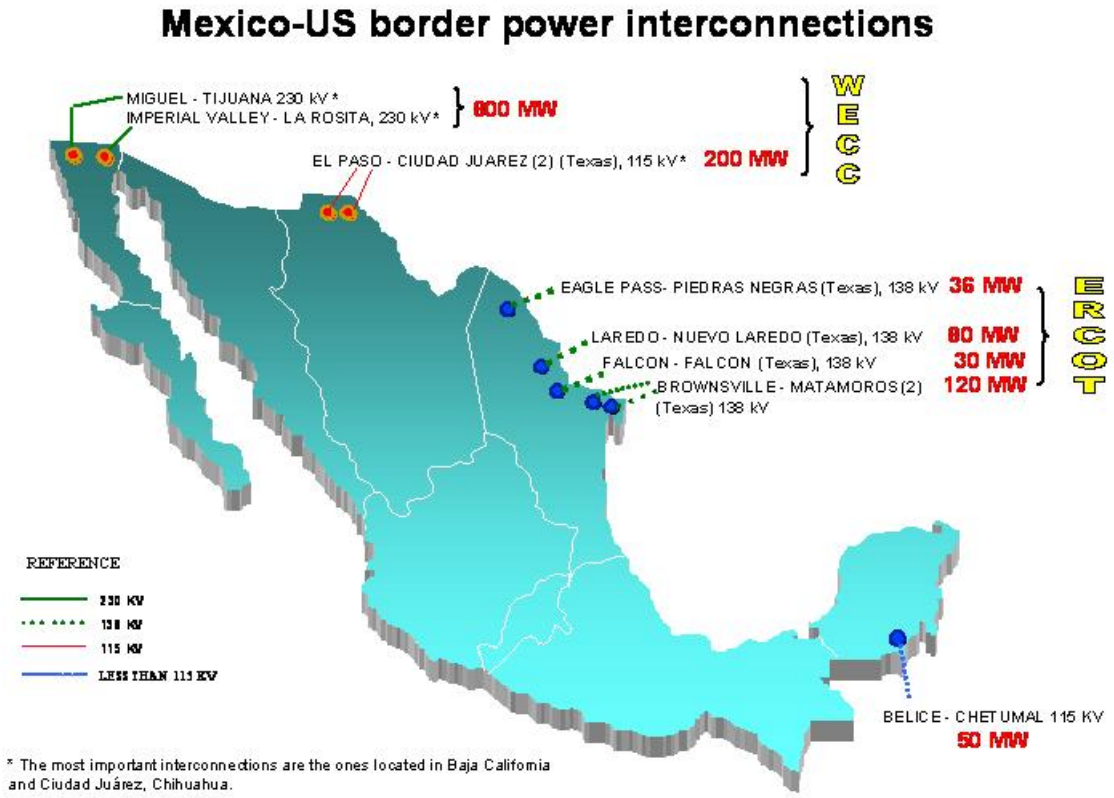
One of the key infrastructure issues for North America is interconnectivity of transmission. North America has major electric power grids, with potential for increased interconnectivity. Within the area of the NERC councils there are three major systems – the Eastern Interconnection, the Western Interconnection, and the grid within the Electric Reliability Council of Texas (ERCOT) – that have limited cross-grid interconnection capability. In addition, there are interconnection compatibility issues outside the NERC councils, particularly between Mexico and the United States.

Electricity – Canada



- Canadian electricity markets are well integrated with U.S. markets.
- There are plans to expand hydropower generation in Quebec and Newfoundland & Labrador.

Electricity – Mexico



- Thermal power plants power the largest share of Mexican electricity generation
- The highest concentration of power plants is located near the major metropolitan center of Mexican City.

Future Infrastructure Developments

There are many plans to augment North American energy interconnections. This section contains descriptions of projects that are currently being planned or that are being considered.

Future Infrastructure Developments – Canada

The following identifies the new projects that have emerged since 2002.

Projects under active consideration

Natural Gas

- The Mackenzie Valley Pipeline would bring about 0.80 to 1.5 billion cubic feet per day (Bcf/d) of natural gas from the Mackenzie Delta to pipeline connections in Alberta, which connect to the North American market.

- An open season on the Maritime and Northeast Pipeline was held in July 2005, and expression of interest for up to 1.5 Bcf/d was received. Construction would be conditional on the construction of LNG facilities in Nova Scotia and/or New Brunswick.

Electricity

- Seabreeze has proposed an underwater interconnection from Vancouver Island to Port Angeles, Washington. This line would be 550 kilovolts (kV) high-voltage direct current (HVDC) and carry power from the proposed large-scale wind farms on Vancouver Island.

- NorthernLights proposes two 500 kV HVDC lines from Fort McMurray, Alberta: one serving markets in the Pacific Northwest and the other California with a total capacity of 5,000 megawatts (MW).

- The Montana-Alberta Tie Ltd. is 240 kV AC line with a capacity of 300 MW from Lethbridge, Alberta, to Great Falls, Montana.

- The Conawapa project, in Manitoba, proposes to construct 1,250 MW of hydroelectric capacity that would serve markets in Ontario. Planning is at the early stages.

- The International Power Line (IPL) is proposing to increase export capacity from New Brunswick to Maine by 300 MW and import capacity by 400 MW. This project is known as the Northeast Reliability Interconnect Project in the United States.

- Expressions of interest have been called by the province of Newfoundland and Labrador to construct hydroelectric generation on the Lower Churchill River at Gull Lake (2,000 MW) and Muskrat Falls (824 MW). This power could serve markets in Quebec, Ontario and the United States.

Oil Projects

Since 2002, various pipeline expansion projects have been completed. For example, Enbridge's Spearhead reversal opens the markets in the Midwest and the Gulf of Mexico to Canadian oil sands derived crude oil at a capacity of 120,000 barrels per day (bpd) of oil. Terasen's expansion of its Express Pipeline system to 280,000 bpd offers similar increased capacity.

Terasen Pipelines and Enbridge are each developing major pipeline projects that propose to transport oil sands production to the British Columbia coast for export to the United States and Asia-Pacific markets.

- The Gateway project, proposed by Enbridge, consists of a 30-inch crude oil pipeline that would carry an average of 400,000 bpd from Edmonton to a deepwater port at Prince Rupert, British Columbia. This project includes a 16-inch condensate import line with an average capacity of 150,000 bpd running parallel to the oil pipeline. In addition, the project involves a marine tanker terminal at Prince Rupert to service both pipelines as well as related facilities along the proposed corridor for both the marine and Edmonton terminals. The environmental, engineering and land field studies have begun. The open season for the condensate import pipeline ended September 2005. Regulatory application to the National Energy Board is expected in the spring 2006, working towards an in-service date of mid-2010.

- Terasen Pipelines has proposed the Trans Mountain Expansion (TMX), a staged capacity expansion of the pipeline system to provide access to West Coast markets including the lower mainland of British Columbia, Washington and California. In addition, the TMX project provides several options to target the Far Eastern markets. The TMX project comprises an initial Anchor Loop expansion, followed by a southern or northern expansion.

  The Anchor Loop Project will increase current capacity of 225,000 bpd by 35,000 bpd by late 2006. In addition, 170 kilometers of new pipeline from Hinton, Alberta, to Valemount, British Columbia, will be constructed, increasing the capacity to 300,000 bpd by 2008. The southern option would further expand existing pipeline capacity to as much as 850,000 bpd to southern British Columbia, Washington and California or other offshore Pacific Rim markets. It is not likely to be in-service until 2009 or 2010. Alternatively, the northern option would start at Valemount, British Columbia, and terminate, at a location to be decided, on the British Columbia coast. It would ultimately increase capacity to 850,000 bpd. The earliest in-service year would be 2010.

- The Waupisoo Oil Sands Pipeline, announced by Enbridge is a 30 inch, 380-kilometer line beginning at the Athabasca system and terminating at the mainline Edmonton terminal. The initial capacity will be 350,000 bpd, with a maximum capacity of 600,000 bpd. The project will also include a 16-inch diluents line from Edmonton to Fort McMurray. Regulatory filing with Alberta Energy Utilities Board is expected by the end of 2005, with an in-service date of mid-2008.

- Altex is a proposing to build a line from Alberta to bring bitumen-derived crude to the U.S. Gulf Coast. At this time, the company has not provided any cost estimates, nor a proposed route, which indicates that it is at an early stage of development.

- Keystone is a TransCanada proposal (with ConocoPhillips) to ship 435,000 b/d of crude oil from Hardisty, Alberta, to Patoka, Illinois. This project includes the conversion of approximately 540 miles of existing TransCanada pipeline facilities from natural gas to crude oil transmission. The open season closed December 5, 2005.

- The Athabasca line starts at Enbridge's Athabasca Terminal located next to Suncor's oil sands operation north of Fort McMurray and ends at Enbridge's Hardisty Terminal. It began deliveries in April 1999. This pipeline is the only link that directly connects the Athabasca and Cold Lake oil deposits to the Hardisty transportation hub. The proposed expansion to 570,000 b/d may be re-assessed with the approval of the Wapisoo line.

- Express is a Terasen line from Hardisty to Wild Horse, Alberta, delivering to markets in Montana, Wyoming, Utah, and Colorado. The Express system interconnects with the Platte Pipeline system at Casper, Wyoming. The expansion was completed in April 2005 and consisted of adding nine new pump stations in Canada and the United States and building 600,000 barrels of combined new tankage facilities in Hardisty, Alberta, and Casper, Wyoming.

- Southern Access is an Enbridge project for the construction of a new pipeline along the route of Enbridge Energy Partners' Lakehead System in Wisconsin. This segment is scheduled to begin operating in the spring of 2008. The second segment consists of new pipeline from Delavan, Wisconsin, to Flanagan, Illinois, where the Lakehead System interconnects with Enbridge's Spearhead System west of Chicago. Enbridge also proposes to extend the system from Flanagan to Patoka, Illinois. Enbridge is working with its shippers to secure their support for the extension from Superior, Wisconsin, to Wood River, Illinois.

- The Spearhead-Exxon Mobil 20" reversal projects will provide market access to southern PADD II by reversing the flow of the pipeline to ship crude oil from Chicago to the hub at Cushing, Oklahoma, providing Canadian producers and shippers with access to new markets south of Chicago. Depending upon the timing of the planned reversal, the line would be renamed the Spearhead Pipeline, spearheading a number of Enbridge initiatives to provide producers of crude oil from the Alberta oil sands with access to new markets in the U.S. The NEB approved this project with toll changes to the Canadian portion, but the decision is being challenged by U.S. refiners and is on hold.

- Albian Sands–Corridor Pipeline transports diluted bitumen from the Muskeg River Mine to the Scotford Upgrader. The Corridor Pipeline also connects the upgrader to the refinery and the pipeline terminal in the Edmonton area. This system was completed in 2002, and Terasen proposes to expand its capacity with either a new line or looping the existing pipeline.

- For the Corridor Expansion project, Terasen is proposing to expand the capacity of the Corridor Pipeline system to transport the additional product that will be produced by the Muskeg River Mine by July 2009. Corridor Pipeline's current diluted bitumen capacity is approximately 260,000 b/d. The upgraded pump stations and new 42-inch pipeline will increase capacity to approximately 500,000 barrels per day by 2009. The pipeline is designed to support further expansions beyond 2009 at a relatively low cost by adding intermediate pump stations. Terasen will file an application for the Corridor Pipeline Expansion Project with the Alberta Energy Utilities Board and Alberta Environment in late 2005. Construction would begin in late 2006.

- Surmont Pipeline is pending regulatory approval. Construction of the new pipelines and facilities could begin in 2005 with completion in mid- to late-2006.

- Long Lake is pending regulatory approvals. The construction of the new pipelines and associated facilities could be completed in late 2006. The project proposal includes: tankage and metering facilities two pipelines and pumping facilities. Enbridge is currently conducting a public consultation program in connection with the proposed pipeline and terminal facilities.

Future Infrastructure Developments – Mexico

- To enhance the development of the Mexican energy infrastructure, the government is fostering some areas for development by complementary private participation, such as:
    - New generation, co-generation and self-supply electric plants.
    - New mechanisms for private participation in the exploration and production of non-associated natural gas.
    - Maritime LNG terminals.
    - The expansion of the natural gas pipeline network.
    - New participation mechanisms in the LPG market.
    - Natural gas and electricity border interconnections to facilitate the development of the North American energy market.
- Other areas of with potential for private investment include:
    - Energy savings projects
    - Renewable energy projects (geothermal, wind and micro-hydraulics

Future Infrastructure Developments – United States

Since the original version of the Energy Picture in June 2002, the U.S. has approved almost 3,400 miles of natural gas pipeline and over 950,000 horsepower of compression at an estimated cost of approximately $7.1 billion. These projects were primarily designed to transport gas within the United States – either from production areas to the market or from potential liquefied natural gas (LNG) regasification terminals to interconnections with the existing natural gas pipeline grid. The primary production area that projects have focused on is the Rocky Mountain region. These projects are represented by:

- The expansion of the Kern River Gas Transmission pipeline that extends from western Wyoming to southern California, which increased its throughput by nearly 0.9 Bcf per day.
- The new Cheyenne Plains Gas Pipeline Company whose pipeline will transport in excess of 0.7 Bcf per day more than 400 miles from northeastern Colorado to interconnections with other interstate pipelines in eastern Kansas for ultimate delivery to markets in the U.S. Midwest.

- The new Entrega Gas project, a 327-mile pipeline, which will transport up to 1.5 Bcf per day from western Colorado through southern Wyoming to interconnections with other interstate pipelines in northeastern Colorado for redelivery to U.S. Midwest markets.

Over this same period, the United States has approved 192 Bcf in underground storage capacity at new and existing storage fields with a daily deliverability of more than 9.3 Bcf.

Currently, the U.S. has projects pending that total over 930 miles. The predominant purpose of these projects is to transport gas from LNG terminals to the existing pipeline grid. In addition, pending projects would add 33.6 Bcf storage capacity and would have the ability to deliver more than 1.5 Bcf per day. Further, there are twelve projects pending at FERC to construct or expand LNG terminals with a combined daily deliverability of 16.7 Bcf and another pipeline with a capacity of 0.5 Bcf per day that would transport Bahamian LNG to Florida. There are seven offshore LNG proposals pending before the Coast Guard and Maritimes Administration, with a combined daily deliverability of 8.5 Bcf per day.

As mentioned in the Canadian infrastructure section, there is a potential large infrastructure expansion involving the Maritime and Northeast Pipeline in Maritime Canada and the northeast United States. Also, the Alaskan Pipeline Project would transport up to 4.5 Bcf per day from the North Slope of Alaska, through Canada to markets in the lower 48 states of the United States. Another project with cross-border implications with Canada is the possible expansion of the Vector pipeline between Chicago and Sarnia, Ontario. This expansion would increase Vector's capacity by 0.5 Bcf per day.

A new natural gas pipeline project located on the U.S.-Mexico border will also come into being in both the United States and Mexico. The Tidelands Oil and Gas Co. (Tidelands) has proposed to construct a pipeline that would have two "legs" and would commence in south Texas, cross the U.S.-Mexico border, and intersect in the Burgos Hub Area of Mexico near a new gas storage field being developed in that region. Sonora Pipeline, a wholly owned subsidiary of Tidelands, will construct and operate the U.S. portion of the pipeline project. Each of the "legs" of the Sonora Pipeline will have a capacity of 0.5 Bcf per day. Tidelands' corporate affiliate, Terranova Oriente, will construct and operate the Mexican portion. Initially, it is envisioned that gas will flow from the United States to Mexico. It is expected that gas flow will be reversed as a new offshore LNG facility in the Gulf of Mexico is connected to the new storage field.

Two other potential projects that would transport domestic production merit mention:

- The Rockies Express Pipeline, a joint project sponsored by Kinder Morgan Energy Partners and Sempra Pipelines & Storage, a unit of Sempra Energy, would transport up to 2 Bcf per day of Rocky Mountain gas production from Colorado to eastern Ohio, a distance of 1,350 miles.

- The Continental Connector, a new 1,000 mile pipeline system proposed by the El Paso Corporation, would connect three of El Paso's interstate western pipelines with three of its interstate eastern pipelines. This new pipeline would transport between 1 Bcf and 2 Bcf per day of Rocky Mountain production to eastern U.S. markets.

There are also ten potential LNG terminals in the United States that have not filed for approval at this time. The total daily deliverability of these projects is 6.2 Bcf.

(6) Legal and Policy Frameworks

Prior to the conclusion of the Canada-U.S. Free Trade Agreement (FTA) and the North American Free Trade Agreement (NAFTA), the key international trade treaty governing North American energy trade was the General Agreement on Tariffs and Trade (GATT). Both the FTA and NAFTA made some important changes in the rules governing energy trade. The inclusion of energy in these agreements ensured that trade in this increasingly significant sector would be based on internationally recognized, non-discriminatory market-access principles that were already applied in most sectors of economic activity.

The NAFTA has been instrumental in the emergence of an integrated North American market for energy goods. For trade between Canada and the United States, limits on the use of import restrictions and the narrowing in scope of the national security exception in the NAFTA have provided energy exporters with enhanced protection and predictability in terms of market access, while disciplines to limit the recourse to export restrictions help ensure that consumers have secure access to continental supplies of energy.

All three countries continue to enhance and develop energy policies and regulations, as well as pursue coherent market integration and development, through the North American Energy Working Group.

Canada

Regulatory Overview

In Canada, jurisdiction over energy is divided between the federal and provincial and territorial governments. Provincial governments have jurisdictional responsibilities over the exploration, development, conservation, and management of non-renewable natural resources, as well as over sites and facilities for the generation and production of electrical energy within their borders. Federal jurisdiction in energy is primarily associated with regulation of inter-provincial and international trade and commerce, and the conservation and management of non-renewable resources on federal lands.

In 1985, the Government of Canada and the provincial governments in Alberta, British Columbia and Saskatchewan agreed to deregulate the prices of crude oil and natural gas. At the same time, changes in the regulation of the natural gas market permitted end-users to purchase gas directly from producers at negotiated prices. Larger end-users, like industrial customers, have been buying their gas directly from suppliers since 1985, while very few residential and small commercial gas users take this option. In general, smaller users, who are able to buy under direct purchases, use the services of a broker or a marketer or continue to obtain the gas commodity from the regulated distribution company.

Natural gas utilities to varying degrees have undergone restructuring from integrated monopolies into separate marketing, transmission and distribution service companies in British Columbia, Alberta, Manitoba, Ontario, and Quebec. This separation, often called unbundling, was influenced by the deregulation of natural gas prices. While the inter-provincial transportation tariffs remain regulated by the National Energy Board (NEB), the local distribution costs are regulated by the provincial utility boards or provincial governments.

The federal government regulates energy through the NEB, taking into account its commitments under the NAFTA.

Federal Regulation

The National Energy Board

The National Energy Board (the NEB or the Board) is an independent federal regulatory agency that regulates the Canadian energy industry in the public interest. The Board was created in 1959 and is governed by the National Energy Board Act. The Board reports through the Minister of Natural Resources to the Parliament of Canada. It holds either written or oral public hearings where applicants and interested parties can participate. Its main responsibilities are highlighted below.

Pipelines and Power Lines

Inter-provincial and international oil and gas pipelines and additions to existing pipeline systems, under federal jurisdiction, require the NEB's approval before they may be built or expanded. Public oral or written hearings are held for pipeline construction applications exceeding 40 kilometers in length or any other applications at the discretion of the NEB. The NEB is also responsible for ensuring companies comply with regulations concerning the safety of employees, the public, and the environment as they may be affected by the design, construction, operation, maintenance, and abandonment of a pipeline.

The Board regulates pipeline tolls and tariffs under its jurisdiction to ensure they are just and reasonable and that there is no undue discrimination in tariffs or services. The Board requires that all parties have access to pipeline transportation on a non-discriminatory basis.

The Board regulates major pipeline companies. The smaller companies are regulated on a complaint basis whereby the parties are encouraged first to resolve any problems with the pipeline company. If this is unsuccessful, a complaint may be filed with the Board.

Major toll applications normally warrant a public hearing. However, in order to avoid lengthy and costly public hearings, the Board encourages negotiated settlements between market participants. The Board must approve these settlements.

The Board authorizes the construction and operation of international and designated inter-provincial power lines under federal jurisdiction.

Trade

The Board authorizes the export and import of natural gas under either long-term licenses of up to 25 years, following a public hearing; or short-term orders for a maximum period of two years without a public hearing. Propane, butanes and ethane require Board approval for exports, usually in the form of a short-term export order.

The Board regulates oil exports under long-term licenses (more than one year for light crude oil and two years for heavy crude oil). However, no applications for long-term oil exports have been filed for several years.

The Board regulates electricity power exports. The maximum duration of export licenses is up to 30 years.

The Board regulates Frontier lands and offshore areas that are not covered by provincial/federal management agreements. Responsibilities include the regulation of oil and gas exploration, development and production, enhancing worker safety, and protecting the environment.

In addition to its responsibilities under the National Energy Board Act, the Board has responsibilities under the Canadian Environmental Assessment Act, and the Northern Pipeline Act. Under the Canadian Environmental Assessment Act, the Board ensures that appropriate environmental assessments are conducted for projects under its jurisdiction. The Board provides technical and administrative assistance to the Northern Pipeline Agency, which under the Northern Pipeline Act, would oversee the planning and construction of any Canadian portion of the proposed Alaska pipeline.

Joint Federal/Provincial Regulation

Offshore regulation in Atlantic Canada comes under joint federal and provincial responsibility through the Canada-Nova Scotia Offshore Petroleum Board, (C-NSOPB) in Nova Scotia, and the Canada-Newfoundland & Labrador Offshore Petroleum Board (C-NOPB) in Newfoundland.

C-NSOPB and C-NLOPB are independent joint agencies of the Government of Canada and the governments of Nova Scotia and Newfoundland & Labrador, respectively. They have the authority and the responsibility to make all the decisions necessary to permit the exploration for, and the development and production of, offshore oil and gas in an efficient, fair and competent manner. These boards issue licenses for offshore exploration, development, and production.

Provincial Regulation

Oil and Natural Gas

Provincial regulation of oil and natural gas activities, pipelines, and distribution systems is administered by provincial utility boards These regulatory bodies review applications related to oil and natural gas activities and pipelines to ensure that they are in the public interest, having regard to environmental, economic and social effects.

The producing provinces may: impose royalties and taxes on oil and natural gas production; provide drilling incentives; and grant permits, approvals and licenses

to construct and operate facilities. The consuming provinces regulate distribution systems, including the tariffs. The provinces also oversee the retail cost of natural gas to consumers, who purchase gas directly from the distribution company.

Electricity

While the federal government in Canada has interests in a number of aspects of electricity sector regulation, the key initiatives with respect to the restructuring of both wholesale and retail electricity competition have been taken at the provincial level. The key factors affecting decisions in this regard include regional costs, supply and social considerations. To date, two provinces (Alberta and Ontario) have initiated retail competition. The electricity markets in these two provinces account for nearly half the Canadian total. Wholesale competition has achieved broader acceptance, with most provinces having already initiated it or having identified a target date for its commencement. The wholesale competition target dates for the various provinces are as follows: Alberta and British Columbia, 1996; Quebec and Manitoba, 1997; Saskatchewan, 2001; Ontario, 2002; New Brunswick, 2005.

As restructuring proceeds, the generation component of electricity rates will be based on market forces. However, in the restructured market, consumer rates will still be subject to regulatory approval by provincial utility boards, as transmission and distribution will remain regulated.

In August 2004, the province of Alberta introduced the Transmission Regulation, which ensures the Alberta electric system is reliable, efficient and competitive. This change requires the Alberta Electricity System Operator (AESO) to plan transmission facilities to meet the anticipated demand for electricity, generation capacity and reserve margin in a timely manner. Also, the AESO must assess the transmission facilities that interconnect with Alberta so that power can be exchanged with other jurisdictions under normal conditions.

In early 2005, the province of Ontario reassigned several roles and responsibilities for electricity to the newly created Ontario Power Authority (OPA). The OPA is required to file an Integrated Power System Plan (IPSP), which will forecast demand and consider all options to meet that demand including: generation, transmission and conservation. The OPA may be directed by the minister to include goals with respect to generation sources, technologies and demand management. The Ontario Energy Board reviews the IPSP.

In 2005, New Brunswick undertook a limited market restructuring in which municipal utilities and large industrial users can buy power from competitive sources. At the same time, New Brunswick Power has been restructured into four separate operating companies covering: distribution, transmission, generation, and nuclear power. The recently created New Brunswick System Operator is responsible for developing integrated system plans but cannot directly implement them.

Mexico

Regulatory Overview

Natural Gas

In Mexico, natural gas exploration, production, processing, and "first-hand sales" activities are considered strategic activities performed by the state-owned company *Petróleos Mexicanos* (Pemex). In accordance with the current legal framework, the public and private sectors participate in storage, transportation and pipeline distribution, including import and commercialization (market) activities in Mexico.

NATURAL GAS PERMITS, AS OF AUGUST 2005

Type	Permits	Committed Investment (million dollars)
Distribution	**21**	**674**
Transportation	**19**	**1,807**
Self-use transportation	**110**	**226**
Total	**150**	**2,707**

The Energy Regulatory Commission (*Comisión Reguladora de Energía* or CRE) regulates the electricity and natural gas industries. As of August 2005, the CRE has granted 21 distribution and 129 transportation permits. These permits represent investments of $2.7 billion.

With the purpose of increasing natural gas supply to complement national production, Mexico's Sectorial Energy Program 2001-2006 considers the promotion of liquefied natural gas (LNG) facilities in the Gulf of Mexico and in the Pacific Coast.

In the last five years, a greater participation of the private sector in the development of infrastructure has been sought, in areas permitted within the legal framework. Thus, large regasification facilities projects have emerged in Mexico that seek the diversification of the imports to satisfy, at competitive prices, the market's demand growth in the short term. As of August 2005, Mexico's Energy Regulatory Commission has awarded three LNG storage permits.

Electricity

In Mexico, Constitutional provisions set the legal framework for the electricity industry. Article 27 establishes that generation, transmission, distribution, and supply of electricity to be used as public service[9] is exclusively the federal government's responsibility. Article 28 further establishes that all strategic activities carried out by the federal government shall not be considered a monopoly. Article 25 provides that the federal government is empowered to own and operate public companies with the exclusive purpose of implementing identified strategic activities like the electricity sector.

[9] Public service refers to any activity reserved to, and performed exclusively by, the government.

PERMITS GRANTED IN GAS STORAGE AS OF AUGUST 2005

Operator	Location	Regasification Capacity (Bcf/d)	Start-up	Committed Investment (MM USD)
Terminal de LNG de Altamira	**Altamira**	**0.75**	**2006**	**440.0**
Energía Costa Azul	**Ensenada**	**1.00**	**2008**	**668.6**
Chevron Texaco de México	**Islas Coronado**	**0.70**	**2009**	**758.0**

Source: CRE.

Despite the strong presence of the federal government, there are opportunities for private sector involvement in the electricity sector. In December 1992, the Public Electricity Service Act (*Ley del Servicio Público de Energía Eléctrica* or LSPEE) was amended to allow private participation in generation activities. Article 3 of this Act lists five areas that are not considered as public service and that are open to the private sector participation:

- Self supply[10]
- Cogeneration
- Independent Power Producers (IPP)[11]
- Imports and exports
- Small-scale generation[12]

By August 2005, the CRE had granted 298 permits: for self-supply (205), cogeneration (39), and IPPs (21), as well as 28 import and five export permits. These permits represent investments of $13.9 billion in the construction and operation of 21,522 MW.

PERMITS GRANTED IN ELECTRICITY FROM 1994 TO AUGUST 2005

Type	Permits	Capacity (MW)	Investment (MM USD)
Self supply	**205**	**4,932**	**4,408**
Cogeneration	**39**	**2,213**	**1,506**
Independent Production	**21**	**12,557**	**6,906**
Imports	**28**	**190**	**18**
Exports	**5**	**1,630**	**1,092**
Total	**298**	**21,522**	**13,930**

[10] Self-supply refers to power plants built and operated by private companies for their own use.

[11] Independent Power Producers are power plants with an installed capacity larger than 30 MW, built and operated by private companies where electricity is sold exclusively to Comisión Federal de Electricidad (CFE) through a Power Purchase Agreement.

[12] Small-scale generation refers to power plants with an installed capacity no larger than 30 MW, built and operated by private companies where electricity is sold to CFE without a Power Purchase Agreement.

Legal Framework

The Regulatory Act of the Constitutional Article 27 on Petroleum defines the oil industry and establishes the regulatory industry structure. Furthermore, this act determines the activities defined as strategic and reserved only to the government (exploration, extraction, production and "First-Hand Sales") and those activities open to private participation (construction, operation, transportation, storage, and distribution, including international and domestic commercialization).

Energy Regulatory Commission Act

In October 1995, the Energy Regulatory Commission Act (*Ley de la Comisión Reguladora de Energía* or LCRE) transformed the CRE from an advisory body on gas and electricity (as set out in its 1993 creation decree) into an autonomous agency, which regulates the electricity and natural gas industries. The CRE promotes and enforces the efficient development of the following activities:

Regulated activities (natural gas):

- Natural gas first-hand sales
- Liquefied petroleum processing
- Natural gas transportation, distribution and storage

Regulated activities (electricity):

- Public service electricity supply
- Electricity generation of private parties
- Exports and imports between private parties
- Electricity acquisitions for public service
- Transmission services between the supplier and private generation permit holders.

Natural Gas Regulation (NGR) (November 25, 1995)

The NGR establishes the regulatory principles empowered by the Regulatory Act of the Constitutional Article 27 on Petroleum. The NGR provides the framework by which Pemex and private investors are regulated with respect to natural gas activities. For this matter, CRE may issue general directives to improve regulation in these activities. Accordingly, public and private participation in transportation, storage and distribution activities are subject to permit regulation.

There are four directives regarding Natural Gas Regulated Activities:

Directive on the Determination of Prices and Rates for Natural Gas Regulated Activities/DIR-GAS-001-96 (March 20, 1996)

The CRE establishes the methodologies, criteria and guidelines by which Pemex and the permit holder must estimate the natural gas price and rates, provide the required information and conform to all dispositions the Commission issues.

Natural Gas "first-hand sales" are regulated by price caps considering international market reference prices and the transportation cost within Mexico. The objective of this regulatory methodology is to find the opportunity cost and to develop competitive market conditions.

Accounting Directive for Natural Gas Regulated Activities/DIR-GAS-002-96 (June 3, 1996)

The Accounting Directive establishes criteria and accounting guidelines to be used by the regulated businesses pursuant to the Natural Gas Regulation and the directive on the Determination of Prices and Rates for Natural Gas Regulated Activities DIR-GAS-001-1996. The Directive was formulated to establish uniform criteria and accounting guidelines for the calculation of prices, as well as to determine the accounting status and performance of businesses in order to verify compliance with the applicable law and to avoid cross-subsidies among different businesses lines. Permit holders shall present their financial information according to the bulletins, documents and memorandums contained in the Generally Accepted Accounting Principles (GAAP) in Mexico and other documents issued by the Mexican Institute of Public Accountants, or PCGA.[13] Furthermore, this directive establishes a specific applicable methodology for the revaluation of non-monetary assets and for the depreciation of fixed assets, items for which the PCGA does not establish a specific method. The Accounting Directive standardizes the information that Pemex and the permit holders must submit to the CRE.

Directive on the Determination of Geographic Zones for Natural Gas Distribution/DIR-GAS-003-96 (September 27, 1996)

This directive is aimed at setting the criteria and the guidelines that will be used by the Commission to determine geographic zones for natural gas distribution and to advise interested parties in developing natural gas distribution projects in the country. These zones are defined under economic, technical and urban design criteria, which foster profitable and efficient distribution systems accordingly to regional and national environmental priorities. Geographic zones were created to facilitate the commercialization of natural gas to make possible the development of a local pipeline distribution network located within a zone. Most of the time, these zones are established within the limits of urban centers, and the entity that obtains the license for gas distribution is expected to create this distribution network. The conduction of gas and the pipelines located outside of these geographic zones are considered as transport and are operated and developed by Pemex.

These criteria and guidelines are the result of a comprehensive review of different types of population centers in the country, of the objectives and strategies of the National Urban Development Program (*Programa Nacional de Desarrollo Urbano*), of the National Urban System (*Sistema Urbano Nacional*), and of the specific urban

[13] PGCA refers to the *Principios de Contabilidad Generalmente Aceptados*.

development programs for various population centers.

These guidelines help the Commission clarify the process for the determination of geographic zones, through the evaluation of the proposed zones and the resolution of proposals to modify such geographic zones. Moreover, the directive provides parties interested in natural gas distribution projects the guidance to define and propose a geographic zone consistent with national environmental and regional priorities.

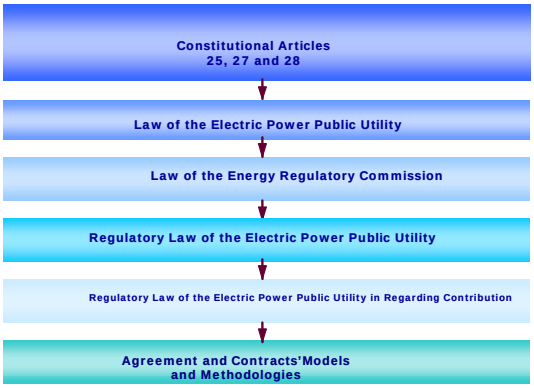
These guidelines are expected to promote the efficient and profitable development of the natural gas distribution services and should foster the development and growth of the transportation systems.

Directive on Natural Gas First-Hand Sales/DIR-GAS-004-00 (February 23, 2000)

This directive establishes the guidelines and criteria that Pemex and subsidiary agencies must follow regarding obligations and accounting information for natural gas "first-hand sales." The Directive was formulated with the objective of introducing certainty and supplying the "first-hand sale" regulation for an efficient performance of the gas industry.

Electricity

ELECTRIC REGULATORY FRAMEWORK



Constitutional Articles 25, 27 and 28

In Mexico, constitutional provisions set the legal framework for the electricity industry. The Constitution establishes that generation, transmission, distribution and supply of electricity to be used as public service are exclusively federal government responsibility and shall not be considered monopolistic activity. According to law, generation, transmission, distribution and sale of electricity for public service are carried out by two government-owned electric utilities: the *Comisión Federal de Electricidad* (CFE) and LFC. CFE has an obligation to supply electricity as a public service to the entire country, with the exception of the Ciudad de México (Mexico City) and some municipalities of the states of Mexico, Morelos, Hidalgo, and Puebla, where LFC is the supplier.[14]

[14] The installed generation capacity owned by these two public entities accounts for 92 percent of total capacity. The rest is owned by outside firms, including Pemex and private self-generators and co-generators. In the near future, several Independent Power Producers (IPPs) will begin operation under contractual agreement terms with the public entities.

Public Electricity Service Act

The objective of this Act is the regulation of the public electricity service and of the activities defined in this Act that do not constitute public services. In December 1992, the Public Electricity Service Act was amended to allow private sector participation in generation activities such as cogeneration, self-supply, independent production, small-scale generation, importation, and exportation of electricity.

Public Electricity Service Ruling Act

The Public Electricity Service Ruling Act explains in detail said the Public Electricity Service Act as it applies to public service supply. Moreover, this Ruling Act establishes CRE's mandate to grant generation permits to private parties and sets up the general principles to be followed

Public Electricity Service Act Ruling on Contributions

The Public Electricity Service Ruling Act on Contributions (Contributions Ruling Act) is aimed at regulating the costs that private parties requesting public electricity service must meet when the extension or modification of the suppliers (CFE and LFC) facilities is required.

Energy Regulatory Commission Act

The CRE Act, passed by Congress in October 1995, established the CRE's independence and defined its powers and duties. Furthermore, it enhanced the clarity, transparency and stability of the regulatory framework for the natural gas and electricity industries. The act strengthened the institutional framework by allowing legal reforms to take place. Additionally, it expanded the CRE's purview by combining a range of regulatory functions previously spread across several government agencies.

Foreign Investment Act

The Foreign Investment Act establishes the guidelines and regulations by which foreign investments are governed in Mexico. This Act does not consider generation activities, such as small-scale production, cogeneration, self-supply, independent production, and electricity imports and exports, to be state-exclusive activities. These generation activities are available for foreign participation.

Natural Gas and Electricity Regulated Activities

Natural Gas

Exploration and Production: The state-owned company, Pemex, legally has the natural gas production monopoly. Also, Pemex maintains the natural gas "first-hand sales" monopoly.

Transportation: This is a regulated activity with public and private participation. Pemex controls 85 percent of the installed capacity. Additionally, the CRE has granted 129 transportation permits (19 of open access and 110 to self-use transportation), some of which are currently under a construction process.

Distribution: The CRE has granted 21 local private distribution companies

permits to operate the natural gas distribution system. Some of them are expanding their own distribution networks.

Natural Gas Regulation: The CRE is responsible for the granting of permits for the development of natural gas infrastructure. This regulation establishes the maximum price of first hand sales that shall be set in accordance with directives issued by the Commission. The price calculation methodology shall reflect gas opportunity costs, competitive conditions in international markets, and the place where the sale is made considering price caps. Storage regulation is determined on a case-by-case basis. Domestic and international commerce are not regulated activities.

Electricity

Reforms to the Electricity Law in 1992 created a limited opening for private participation in the sector from both foreign and domestic sources. These reforms allowed private participation in electricity generation in Mexico.

In 1993, the Regulations of the Public Service of Electric Energy Law (the Regulations) were published. Among other topics, they include the criteria that govern the activities of electric energy generation, exporting, and importing by private entities.

The Law and the Regulations define six types of permits for the activities that are not considered public service: self-supply, cogeneration, independent power production, small production, importing and exporting, and establish the conditions under which each one of the permits shall be granted (Article 36).

The Ministry of Finance, with the involvement of the ministries of energy and economy, determines, according to CFE proposals, the electricity tariffs as well as the tariffs' adjustments and structure, considering the financial and the expansion requirements of the electricity services.

Jurisdiction

Ministry of Energy

The Ministry of Energy is responsible for Mexico's energy policy within the current legal framework to ensure a competitive, sufficient, high-quality, economically feasible, and environmentally sustainable supply as required by the ever-growing national demand.

Energy Regulatory Commission

The CRE was created in 1994 as a consultative body reporting to the Ministry of Energy, and its role as an advisor was limited to the electricity industry. The CRE Act (1995) transformed its role to that of an empowered, independent regulator with technical and operational autonomy and provided the CRE with a legislative mandate to regulate the activities of both public and private operators in the electricity and gas industries.

The CRE Act defines the following activities subject to regulation:

- Supply and sale of electricity to public service customers

- Private sector generation, import and export of electricity
- Acquisition of electricity for public service
- Transmission services between agencies that provide public service and generation, export and import permit holders
- Natural gas and LPG first-hand sales
- Natural gas transportation and storage that is not related to exploration or production
- Natural gas distribution, and
- LPG transportation and distribution through pipelines.

The main functions of CRE are to grant permits, authorize prices and rates, approve terms and conditions for the provision of services, issue directives, resolve disputes, request information, and impose sanctions, among others. The CRE Act also establishes the Commission's organization and operation. Thus, it defines the CRE as a technical and operational autonomous agency that issues resolutions through a collegiate body.

President Fox Ten-Point Action Plan (September 2005)

Due to the negative impacts of 2005's Hurricane Katrina on Mexico's hydrocarbons infrastructure, President Vicente Fox announced several measures aimed to mitigate the effect of high-energy prices in the short term. These policies also include measures aimed at the medium and long term, addressing the lack of in-depth reforms within the energy sector, which seriously constrain the capacity to take full advantage of the natural gas in Mexico.

In order to take the necessary actions given the country's situation and to strengthen, in a permanent way, the energy supply's structure, the plan includes:

- Sending Congress a bill including Constitutional reforms with the purpose of complementing public investment with private capital for exploration, exploitation and various activities related to the development of non-associated natural gas. This action responds to the rise in energy demand and guarantees that Mexican resources will be used for the sole benefit of its citizens.

- A second bill that proposes a reform to the *Ley Reglamentaria del Artículo 27 Constitucional del Ramo del Petróleo*[15] includes a proposal to the legislative branch for complementing public investment with private capital regarding oil and its derivatives' storage infrastructure and pipelines. The federal government's intention is to look after Mexico's patrimony and to improve the safety of the oil derived products' distribution net, which also protects the country's environment.

[15] Regulatory Act of the Constitutional Article 27 on Petroleum.

Renewable Resources

A bill on renewable resources was presented to the Lower House of Congress, which aims to foster the development of renewable energy. With this bill, the Mexican regulatory framework will be strengthened through the recognition of the benefits derived from renewable energy in power generation and other applications. The bill also includes provisions to create a renewable energy fund to make renewable-based generation competitive versus other fossil-fuel based projects. Another highlight of the bill is the creation of a National Renewable Energy Program.

United States

Energy Policy Act of 2005

On August 8, 2005, U.S. President George W. Bush signed the Energy Policy Act of 2005 (EPAct 2005 or the Law), landmark legislation that improves energy efficiency and expands the use of renewable sources of energy. A key focus of the law involves important measures that seek to promote greater conservation and alter the United States' energy mix, including a strengthened emphasis on nuclear power and technological innovation. The EPAct 2005 also provides significant incentives for the further development and production of traditional energy sources. The law reworks important aspects of electricity, natural gas (in particular, liquefied natural gas or LNG), and petroleum regulatory concerns and provides for a comprehensive and long-range approach to addressing the energy challenges facing the United States.

Highlights of the Energy Policy Act of 2005 include:

- $14.6 billion in tax incentives to promote investment in clean-coal facilities, renewable energy production, fossil fuel production, conservation and energy efficiency, and the promotion of alternative fuels, especially in the transport sector
- Simplification of the siting and permitting process for LNG terminals and other natural gas transmission facilities
- Extension of incentives for the construction of nuclear power facilities
- Measures to encourage the use of ethanol and other biofuels
- Establishment of federal backstop authority for the siting of interstate electric transmission facilities
- Repeal of the Public Utilities Holding Company Act (PUHCA) of 1935 and enactment of the PUHCA of 2005.

Emphasizing Nuclear, Renewables, Efficiency, and Conservation

The EPAct 2005 provides for further progress in the national discussion on nuclear energy, in particular by

extending the limitation on nuclear plant operator liability of $10 billion until 2025. This extension clarifies the future liability for the construction of new nuclear facilities. In addition, proponents of advanced nuclear power facilities that are put into service by 2021 will receive significant tax credits during their first eight years of operation.

For renewable energy sources, credits also target wind, geothermal and biomass electricity suppliers. In order to increase the use of these sources, the Law also sets up grants for biomass producers and streamlines the Department of the Interior and Department of Agriculture processes for selling leases for areas that may produce geothermal energy. Further provisions support the use of clean-coal technology, including funding for further research and experimental facilities, as well as a new program designed to encourage power production through generating equipment using clean-coal technology.

The Law also contains numerous programs that advocate energy conservation and improved efficiency at the federal, state and local levels. These measures include tax credits worth $1.3 billion, assistance for low-income housing to improve efficiency, funding for home appliance-standards programs, and research into and promotion of alternative-fuel vehicles, both hydrogen fuel cells and hybrid technology.

Legal and Regulatory Measures for Electricity and Traditional Sources

Electricity

Since 1935, the Commission has regulated certain electric utility activities under the Federal Power Act (FPA). Under FPA Sections 205 and 206, the Commission oversees the rates, terms and conditions of sales for resale of electric energy and transmission service in interstate commerce by public utilities. The Commission must ensure that those rates, terms and conditions are just and reasonable, and not unduly discriminatory or preferential. Under FPA Section 203, the Commission reviews mergers and other asset transfers involving public utilities. While the utilities regulated under FPA sections 203, 205 and 206 are primarily investor owned utilities, government-owned utilities (e.g. Tennessee Valley Authority, federal power marketing agencies, and municipal utilities) and most cooperatively owned utilities, with certain exceptions, are not subject to the Commission's regulation.

Relevant measures addressing electric power and traditional sources of energy in the EPAct 2005 include granting greater powers to the Federal Energy Regulatory Commission (FERC or the Commission) to monitor private companies involved in electricity generation and transmission. Under the Law, FERC monitors electric power company finances, including the authority to examine the accounts of all companies owning or partly owning an electric power facility. It also reviews the holding of officer and director positions between top officials in utilities and certain other firms with which they do business. Further authority is extended to FERC that allows its promotion of market stability through transparency by publishing wholesale electricity prices.

In addition, FERC has jurisdiction over reliability standards for electricity

transmission networks through the certification of regional electric reliability organizations (EROs), which are tasked with creating and enforcing standards. The Commission can impose penalties in the event of violations of these levels.[16] The Department of Energy's Office of Electricity Delivery and Energy Reliability has responsibility for providing FERC and the EROs with technical support. The EPAct 2005 also authorized FERC to establish incentive-based rates for interstate transmission by public utilities in order to promote investment in improved networks and technology and involvement in regional transmission organizations. It also granted FERC authority to issue permits for new power lines in areas designated by the Secretary of Energy as "National Interest Electric Transmission Corridors" if the Commission finds that: (1) the relevant state does not have the authority to either approve the siting or consider the interstate benefits expected to be achieved; (2) the applicant does not qualify for state approval because it does not serve end-use customers in that state; or (3) the state did not act within one year after the filing of an application or the state conditioned its approval such that congestion will not be significantly reduced or is not economically feasible.

The EPAct repeals the 1935 Public Utility Holding Company Act, which asserted ownership and operational restrictions on power companies and their ability to dictate prices. Under the new Law, the Commission and state agencies will have increased access to holding company books and records in order to protect customers of regulated utilities.

Hydroelectric power regulation occurred after Congress passed the Federal Water Power Act of 1920. The Federal Water Power Act was subsequently made Part I of the FPA in 1935. Under this statute as well as later statutes up to and including the EPAct 2005, the Commission regulates non-federal hydroelectric power projects that affect navigable waters, occupy federal lands, use water or waterpower at a government dam, or affect the interests of interstate commerce. This work includes: issuing preliminary permits, project licenses and exemptions from licensing; ensuring dam safety; performing project compliance activities; investigating and assessing payments for headwater benefits; and coordinating with other agencies. Under the EPAct 2005, FERC hears appeals to these rulings and allows applicants to offer alternatives to government conditions, which federal agencies must accept if it determines that the alternative provides adequate protections.

Natural Gas

Under existing law, FERC regulates both the construction of pipeline facilities and the transportation of natural gas in interstate commerce. Companies providing services and constructing and operating interstate pipelines must first obtain Commission certificates of public convenience and necessity. Commission approval is required to set and subsequently change rates for these services. In addition, Commission approval is required to abandon facility use and services. The Commission also regulates the transportation of natural gas as authorized by the Natural Gas

[16] Under the Energy Policy Act of 2005, Alaska and Hawaii are exempt from provisions calling for electric reliability organizations.

Continental Shelf Lands Act (OCSLA).

In addition, the Commission, under Section 3 of the Natural Gas Act (NGA), authorizes the siting, construction, and operation of facilities needed by pipelines at the U.S. point of entry or exit to import or export natural gas. Further, those pipeline companies that propose to construct, operate, maintain, or connect facilities to import or export natural gas at either the Canadian or the Mexican border must file an application for a Presidential Permit, which is processed by FERC, in consultation with the State and Defense Departments.

With LNG becoming an important source of natural gas, the EPAct 2005 sought to simplify both the siting and permitting of LNG facilities to facilitate their construction. The Law explicitly states that FERC possesses sole authority to approve the construction, expansion or operation of any facility that imports or exports natural gas, including LNG, although it must still consult with the states on safety issues related to these facilities. The Law also codifies the policy adopted by FERC in December 2002 through the Hackberry decision, which said that LNG facilities need not offer open access.

Further, the EPAct 2005 includes measures expanding FERC's right to grant market-based rates for new natural gas storage facilities. It also designates the Commission as lead agency on matters related to the country's natural gas infrastructure, allowing it to establish the deadlines for decisions and to maintain a consolidated record to be used in appeals and judicial reviews.

Petroleum

The Interstate Commerce Act (ICA) gives the Commission jurisdiction over the rates, terms and conditions of transportation services provided by interstate oil pipelines. The Commission has no authority over the siting and construction of new oil pipelines, or over other aspects of the industry such as production, refining or wholesale or retail sales of oil.

A key portion of the EPAct 2005 relates to petroleum usage, instructing the Environmental Protection Agency (EPA) to enter into agreements with state and local governments to expedite the approval process for new refineries in order to encourage the construction of these facilities.

The new Law also authorizes the Department of Energy to increase the Strategic Petroleum Reserve, retained in the event of severe shortfalls of crude supply, from 700 million barrels to 1 billion barrels.

Federal Lands

Onshore federal lands produce 8 percent of U.S. natural gas and 5 percent of its crude oil.[17] Similarly, federal offshore areas account for approximately 28 percent of U.S. crude oil production and 23 percent of U.S. marketed gas production.[18] Under existing law, federal lands deemed suitable for resource development are leased to private sector operators for oil and gas development.

[17] U.S. Department of the Interior, Bureau of Land Management, http://www.blm.gov/nhp/g_commercial.html.

[18] U.S. Department of Energy, Energy Information Administration (EIA), *Natural Gas Annual 2003*, (Washington, DC, December 2004), Table 3, and EIA, *Petroleum Supply Annual 2004 Volume I*, (Washington, DC, June 2005), Table 14.

Companies competitively bid the right to explore and develop federal onshore and offshore lands. Successful leaseholders pay an initial bonus and annual rents for the right to develop federal properties. Moreover, in the event that hydrocarbon resources are discovered and extracted from these lands, the federal government is entitled to a percentage royalty, based on the value of resource production. In addition, the Law specifies that the Department of the Interior should receive royalty payments in oil or gas rather than cash. Existing law allows companies to claim geological and geophysical expenses as deductible business expenses.

The EPAct 2005 streamlines judicial reviews of infrastructure design and calls for the designation nationwide of "energy right-of-way corridors" for the placement of oil, gas and hydrogen pipelines and electricity transmission and distribution facilities on federal lands. The decisions will be derived from an interagency process, in consultation with the Commission, and must come within two years of the signing of the Law in Western states and four years for the rest of the country.

Environmental Regulations: Federal and State Roles

The federal and state governments play significant roles, often in cooperation with one another, in setting environmental performance standards regarding onshore and offshore oil and natural gas operations. Within the past 25 years, several major federal statutes have established federal requirements governing air emissions, discharges to surface water, and the management and disposal of hazardous and non-hazardous solid wastes. These regulations have significant impacts on all phases of oil and gas operations, for example:

- Subsurface injection of exploration and production wastes;
- Atmospheric emission of chemicals from refineries;
- Management and disposal of drilling muds and fluids;
- Surface discharge of exploration and production wastes in onshore, coastal, and offshore areas;
- Maintenance of underground oil and gasoline storage tanks; and
- Wetlands operations.

These standards are set by federal statute and managed by various offices within the Environmental Protection Agency (EPA). However, in most instances, policy implementation and enforcement is the jurisdiction of individual states. Due to this approach, there is widespread variation among states regarding specific environmental requirements and performance standards. Such variation is often necessary due to varying environmental conditions, geology, and production economics among the producing states. In the cases in which a state's regulatory program is deemed insufficient by the EPA under minimum federal requirements, the federal government is then responsible for program administration at the state level.

In addition to state-led environmental programs, the federal government is active in setting and enforcing environmental standards that address unique habitats and wildlife throughout the country. To the extent that oil and gas operations interact with these environments, operators must comply with regulated standards and work in collaboration with a variety of federal agencies to ensure environmentally sound operations. For example, the Department of the Interior's Fish and Wildlife Service (FWS) oversees a regulatory and technical assistance program that protects endangered and threatened wildlife species. The Department of Commerce, through its National Oceanic and Atmospheric Administration (NOAA), works in partnership with states to oversee the effective management, beneficial use, protection, and development of sensitive coastal zones in the United States. Wetland areas, frequently impacted by oil and gas operations, are regulated by the U.S. Army Corps of Engineers, a branch of the Department of Defense. Similarly, oil and gas operations on both onshore and offshore federal lands are also subject to federal review and oversight. As steward of these lands for the country, the federal environmental protection role is significant in these areas. Offshore, for example, the Minerals Management Service (MMS) conducts annual and periodic unscheduled inspections of operators to ensure that safety and environmental requirements are being met. Operations on onshore federal lands are managed by the National Park Service (NPS), the U.S. Forest Service, the Bureau of Indian Affairs (BIA), and the Bureau of Land Management (BLM).

Index of U.S. Federal Agencies with Energy Regulatory Roles

Department and Agency	Primary Role
Department of Agriculture (USDA)	
United States Forest Service	Federal Lands Stewardship
Department of Commerce (DOC)	
Bureau of Export Administration (BXA)	Export Control
International Trade Administration (ITA)	Foreign Trade Development
National Oceanic and Atmospheric Administration (NOAA)	Environmental Protection
Department of Defense (DOD)	
United States Army Corps of Engineers	Environmental Protection
Department of Energy (DOE)	
Federal Energy Technology Center (FETC)	Technology Development
Federal Energy Regulatory Commission (FERC)	Interstate Commerce and Environmental Regulation
National Laboratories	Technology Development
Office of Fossil Energy	Fossil Energy Policy
Fossil Energy International Program	Foreign Trade Development
Natural Gas and Petroleum Import and Export Office	Foreign Trade Development
National Petroleum Technology Office	Technology Development
Naval Petroleum and Oil Shale Reserves	Federal Resource Development
Office of Natural Gas and Petroleum Technology	Technology Development & Policy Analysis
Strategic Petroleum Reserve (SPR)	Energy Security
Department of the Interior (DOI)	
Bureau of Indian Affairs (BIA)	Native American Oil & Gas Rights
Bureau of Land Management (BLM)	Federal Lands Stewardship
United States Fish and Wildlife Service (FWS)	Federal Lands Stewardship

United States Forest Service (USFS)	Federal Lands Stewardship
United States Geological Survey (USGS)	Resource Assessment
Minerals Management Service (MMS)	Federal Lands Stewardship & Royalties
National Park Service (NPS)	Federal Lands Stewardship
Office of Trust Funds Management	Native American Oil and Gas Royalties
Department of Labor	
Occupational Safety & Health Administration (OSHA)	Workplace Safety and Health
Department of State	Cross-border Liquid Pipeline Permits
Department of Transportation	
Office of Pipeline Safety (OPS)	Pipeline Safety
Department of the Treasury	
Internal Revenue Service	Federal Tax Policy
Environmental Protection Agency	Environmental Protection

Appendix 1. Energy Data

Table 1A. Canada Energy Supply (1980 – 2005)

	1980	1990	2000	2004	2005 [1]
Petroleum Production					
(Thousand Barrels Per Day)	1,771	2,030	2,718	3,093	3,220
Crude Oil	1,544	1,741	2,206	2,575	2,700
Natural Gas Liquids	227	288	512	518	520
Natural Gas Production					
(Billion Cubic Feet)	2,466	3,910	6,562	6,594	6,600
(Billion Cubic Meters)	70	111	186	187	187
Coal Production					
(Million Short Tons)	40	75	76	73	72
(Million Metric Tons)	36	67	68	65	64
Electricity Generation					
(Terawatthours)					
Coal	57	77	110	95	100
Petroleum	13	14	12	19	15
Natural Gas (including supplemental gases)	9	9	31	30	30
Nuclear Power	36	69	69	85	87
Renewable (including hydro)	253	299	363	347	348
Hydropower	251	294	355	338	338
Other Renewable	2	5	8	9	10
Total	367	468	586	576	580
Total Electricity Generating Capacity [2]					
(Gigawatts)					
Coal	15	19	18	17	16
Natural Gas	5	3	4	4	5
Petroleum	8	5	5	5	5
Dual Fired	N/A	N/A	N/A	N/A	N/A
Nuclear	6	13	11	12	12
Renewable	48	59	65	66	68
Hydropower	48	59	64	65	66
Other Renewable	0	0	1	1	2
Total	81	100	103	107	109

[1] Data for 2005 are estimates.

[2] Capacity data for 2004 are estimates.

Note: N/A: Not Available.

Source: Statistics Canada.

Table 1B. Mexico Energy Supply (1980 – 2005)

	1980	1990	2000	2004	2005
Petroleum Production					
(Thousand Barrels Per Day)	2,129	2,970	3,450	3,825	3,839
Crude Oil	1,936	2,548	3,012	3,383	3,392
Natural Gas Liquids	193	422	438	442	447
Natural Gas Production [1]					
(Billion Cubic Feet)	900	903	1,314	1,464	1,797
(Billion Cubic Meters)	25	26	37	41	51
Coal Production					
(Million Short Tons)	4	8	13	11	N/A
(Million Metric Tons)	4	7	12	10	N/A
Electricity Generation					
(Terawatthours)					
Coal	0	8	19	18	18
Petroleum	37	67	90	67	79
Natural Gas (including supplemental gases)	7	8	23	75	70
Nuclear Power	0	3	8	9	9
Renewable (including hydro)	18	28	39	32	28
Hydropower	17	23	33	25	22
Other Renewable	1	5	6	7	6
Total	62	114	179	201	218
Total Electricity Generating Capacity					
(Gigawatts)					
Coal	0	1	3	3	3
Natural Gas (includes other gases and waste heat)	2	3	6	15	16
Petroleum	7	11	14	14	14
Dual Fired	0	0	2	2	2
Nuclear	0	1	1	1	1
Renewable	6	9	10	11	11
Hydropower	6	8	10	11	11
Other Renewable	0	1	1	1	1
Total	15	25	37	47	46

[1] Includes gas from processing centers and directly from fields.

Notes: Natural gas production refers to dry gas. N/A: Not Available.

Sources: Petróleos Mexicanos, Energy Information System (SIE) http://sie.energia.gob.mx/sie/bdiController
Mexico's Energy Secretariat, Power Sector's Outlook 2004-2013, Comisión Federal de Electricidad (CFE).

Table 1C. United States Energy Supply (1980 – 2005)

	1980	1990	2000	2004	2005
Petroleum Production					
(Thousand Barrels Per Day)	10,214	8,994	8,110	7,649	7,300
Crude Oil	8,597	7,355	5,822	5,419	5,129
Natural Gas Liquids	1,573	1,559	1,911	1,809	1,724
Natural Gas Production					
(Billion Cubic Feet)	19,403	17,810	19,182	18,924	18,310
(Billion Cubic Meters)	549	504	543	536	518
Coal Production					
(Million Short Tons)	830	1,029	1,074	1,112	1,137
(Million Metric Tons)	753	933	974	1,009	1,031
Electricity Generation					
(Terawatthours)					
Coal	1,162	1,594	1,966	1,976	2,054
Petroleum	246	127	111	118	121
Natural Gas (including supplemental gases)	346	383	615	715	705
Nuclear Power	251	577	754	789	796
Renewable (including hydro)	285	357	356	359	409
Hydropower	279	293	276	270	294
Other Renewable	6	64	81	89	115
Total [1]	2,290	3,038	3,802	3,953	4,086
Total Electricity Generating Capacity					
(Gigawatts)					
Coal	294	307	315	313	318
Natural Gas (includes other gases and waste heat)	N/A	58	98	225	378
Petroleum	N/A	49	36	37	68
Dual Fired	N/A	114	150	175	N/A
Nuclear	52	100	98	100	100
Renewable	83	87	95	97	94
Hydropower	82	74	79	79	80
Other Renewable	1	13	16	18	15
Total [1]	579	734	812	968	979

[1] Total electricity generation includes other gases (blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels) and hydroelectric pumped storage (pumped storage facility production minus energy used for pumping).

Notes: Totals may not equal sum of components due to independent rounding. N/A: Not Available.

Sources: 1980 through 2004: U.S. Department of Energy, Energy Information Administration (EIA), *Petroleum Supply Annual 2004* (Washington, DC, June 2005), *Annual Energy Review 2004,* DOE/EIA-0384(2004) (Washington, DC, August 2005), and *Monthly Energy Review,* DOE/EIA-0035(2005/10) (October 2005). Estimates for 2005: EIA, *Short-Term Energy Outlook,* DOE/EIA-0383(2005/10) (Washington, DC, October 2005), and *Annual Energy Outlook, 2005,* DOE/EIA-0383(2005).

Table 2A. Canada Energy Demand (1980 – 2005)

	1980	1990	2000	2004	2005 [1]
Petroleum Demand					
(Thousand Barrels Per Day)					
Liquefied Petroleum Gas	25	41	46	40	40
Motor Gasoline	667	585	661	706	720
Aviation Fuel	84	89	111	115	120
Distillate Oil	521	419	503	536	545
Residual Fuel Oil	289	183	148	159	160
Other Oil	248	292	338	406	415
Total	1,834	1,609	1,806	1,962	2,000
Natural Gas Demand					
(Billion Cubic Feet)	1,692	2,453	3,332	3,335	3,410
(Billion Cubic Meters)	48	69	95	94	96
Coal Demand					
(Million Short Tons)	41	57	67	64	65
(Million Metric Tons)	37	51	61	58	58
Electricity Demand					
(Gigawatthours)	339,412	467,249	551,140	565,954	575,000

[1] Data for 2005 are estimates.
Source: Statistics Canada.

Table 2B. Mexico Energy Demand (1980 – 2005)

	1980	1990	2000	2004	2005 [1]
Petroleum Demand					
(Thousand Barrels Per Day)					
Liquefied Petroleum Gas	102	197	330	328	324
Motor Gasoline	313	443	531	636	670
Aviation Fuel	28	36	56	58	65
Distillate Oil	N/A	N/A	N/A	N/A	N/A
Residual Fuel Oil	242	421	492	333	337
Other Oil	282	244	319	37	32
Total	967	1,341	1,728	1,391	1,428
Natural Gas Demand					
(Billion Cubic Feet)	799	918	1,398	1,782	1,783
(Billion Cubic Meters)	23	26	40	50	50
Coal Demand					
(Million Short Tons)	6	8	14	16	N/A
(Million Metric Tons)	5	7	13	15	N/A
Electricity Demand					
(Gigawatthours)	56,980	100,218	166,424	183,972	194,075

[1] Includes self-supply and cogeneration.

Note: N/A: Not Available.

Sources: Petróleos Mexicanos, Energy Information System (SIE) http://sie.energia.gob.mx/sie/bdiController Mexico's Energy Secretariat, Power Sector's Outlook 2004-2013, Comision Federal de Electricidad (CFE).

Table 2C. United States Energy Demand (1980 – 2005)

	1980	1990	2000	2004	2005
Petroleum Demand					
(Thousand Barrels Per Day)					
Liquefied Petroleum Gas	1,469	1,556	2,231	2,132	2,054
Motor Gasoline	6,579	7,235	8,472	9,105	9,099
Aviation Fuel	1,068	1,522	1,725	1,630	1,632
Distillate Oil	2,866	3,021	3,722	4,058	4,097
Residual Fuel Oil	2,508	1,229	909	865	862
Other Oil	2,566	2,402	2,642	2,940	2,797
Total	17,056	16,988	19,701	20,731	20,541
Natural Gas Demand					
(Billion Cubic Feet)	19,877	19,174	23,333	22,416	22,149
(Billion Cubic Meters)	563	543	661	635	627
Coal Demand					
(Million Short Tons)	703	904	1,084	1,104	1,153
(Million Metric Tons)	638	820	983	1,002	1,046
Electricity Demand					
(Gigawatthours)	2,094,449 [1]	2,837,084	3,592,357	3,716,503	3,858,600

[1] Includes electric utilities only.

Note: Totals may not equal sum of components due to independent rounding.

Sources: 1980 through 2004: U.S. Department of Energy, Energy Information Administration (EIA), *Monthly Energy Review,* DOE/EIA-0035(2005/10) (October 2005). Estimates for 2005: EIA, *Short-Term Energy Outlook,* DOE/EIA-0383(2005/10) (Washington, DC, October 2005).

Table 3A. Canada Economic Data (1980 – 2005)

	1980	1990	2000	2004	2005 [1]
Gross Domestic Product					
(Billion 1997 Canadian Dollars)	556	708	946	1,044	1,084
(Billion 2000 U.S. Dollars)	527	691	724	910	1,000
Population					
(Millions)	24.6	27.8	30.8	32.0	32.4
Employment					
(Millions)	11.3	13.1	14.9	16.0	16.2

[1] Data for 2005 are estimates.

Sources: Statistics Canada; NRCan Reference, October 2004.

Table 3B. Mexico Economic Data (1980 – 2005)

	1980	1990	2000	2004	2005 [3]
Gross Domestic Product					
(Billion 1993 Mexican Pesos)	949	1,141	1,603	1,710	1,774
(Billion 2000 U.S. Dollars)	206	263	581	676	715
Population [1]					
(Millions)	67	85	101	105	106
Employment [2]					
(Millions)	N/A	23	34	32 [3]	33

[1] Consejo Nacional de Población, CONAPO (National Population Council).

[2] Instituto Nacional de Estadística Geografía e Informática, INEGI (National Statistics, Geography and Computing Institute).

[3] Estimated.

Note: N/A: Not Available.

Sources: Banco de México and Organization for Economic Cooperation and Development.

Table 3C. United States Economic Data (1980 – 2005)

	1980	1990	2000	2004	2005
Gross Domestic Product					
(Billion 2000 U.S. Dollars)	5,162	7,113	9,817	10,756	11,132
Population					
(Millions)	227.7	250.1	282.3	293.0	295.5
Employment					
(Millions)	99	119	137	139	142 [1]

[1] Employment figure for 2005 is based on an eleven-month average.

Sources: International Monetary Fund, World Economic Database, September 2005. U.S. Department of Commerce, Bureau of Census and Bureau of Economic Analysis; U.S. Department of Labor, Bureau of Labor Statistics.

Table 4A. Canada Energy Demand by Sector (1980 – 2005)

	1980	1990	2000	2004	2005 [1]
Petroleum					
(Thousand Barrels per Day)					
Residential	261	149	135	114	116
Commercial	107	120	144	198	200
Residential & Commercial	368	269	279	312	316
Industrial	567	500	526	622	640
Transportation	888	794	965	1,025	1,050
Total	1,823	1,563	1,770	1,959	2,006
Natural Gas					
(Billion Cubic Feet)					
Residential	402	521	631	628	640
Commercial	381	18	48	481	490
Residential & Commercial	783	539	680	1,109	1,130
Industrial	829	1,466	2,100	2,127	2,170
Transportation	73	127	208	157	160
Total	1,685	2,133	2,988	3,393	3,460
Coal					
(Million Short Tons)					
Residential	0.2	0.1	0.1	0.1	0.1
Commercial	0.1	0.0	0.0	0.0	0.0
Residential & Commercial	0.2	0.1	0.1	0.1	0.1
Industrial	40.9	54.3	67.8	68.5	70.0
Transportation	0.0	1.8	0.0	0.0	0.0
Total	41.2	56.2	67.9	68.6	70.1
Electricity					
(Gigawatthours)					
Residential	92,673	138,468	147,748	161,121	164,000
Commercial	6,339	95,638	111,856	120,130	122,000
Residential & Commercial	99,012	234,106	259,604	281,251	286,000
Industrial	45,900	217,151	283,858	280,049	285,000
Transportation	2,284	3,270	4,524	3,938	4,000
Total	147,196	454,527	547,987	565,238	575,000

[1] Data for 2005 are estimates.

Table 4B. Mexico Energy Demand by Sector (1980 – 2005)

	1980	1990	2000	2004	2005 [9]
Petroleum [1]					
(Thousand barrels per day of equivalent crude oil). . . .					
Residential [2]	80	120	134	134	129
Commercial [3]	24	24	31	29	28
Residential & Commercial	104	144	165	163	157
Industrial [4]	99	148	142	151	201
Transportation [5]	442	582	735	870	981
Total	645	874	1,042	1,184	1,339
Natural Gas					
(Billion Cubic Feet)					
Residential.	20	32	22	34	39
Commercial	N/A	N/A	7	8	9
Residential & Commercia l.	N/A	N/A	29	42	48
Industrial.	516	530	510	472	493
Transportation.	N/A	N/A	0	1	3
Total	536	562	539	516	544
Coal [6]					
(Million Short Tons)					
Residential.	N/A	N/A	N/A	N/A	N/A
Commercial	N/A	N/A	N/A	N/A	N/A
Residential & Commercial	N/A	N/A	N/A	N/A	N/A
Industrial.	N/A	N/A	N/A	0.2	N/A
Transportation.	N/A	N/A	N/A	N/A	N/A
Total	N/A	N/A	N/A	0.2	N/A
Electricity					
(Gigawatthours)					
Residential.	9,995	20,389	36,128	40,733	42,897
Commercial [7]	13,186	19,521	25,465	26,164	27,340
Residential & Commercial	23,181	39,910	61,593	66,897	70,237
Industrial [8]	29,190	52,213	93,755	96,613	101,272
Transportation.	N/A	N/A	N/A	N/A	N/A
Total	52,371	92,123	155,349	163,509	171,510

[1] Refers to oil products' demand.

[2] Includes Kerosene.

[3] Includes Diesel and Fuel Oil.

[4] Includes Petroleum Coke, Kerosene, Diesel and Fuel Oil.

[5] Includes Gasoline and Naftas, Kerosene, Diesel and Fuel Oil.

[6] In Mexico, besides the power sector, the only sector which consumes coal is the Industrial one.

[7] Also includes Agricultural and Services sectors.

[8] Includes public transportation.

[9] Estimated data. Does not include Petroleum Coke.

Notes: N/A: Not Available; Demand refers to final demand exclusively.

Sources: Petróleos Mexicanos, Energy Information System (SIE) http://sie.energia.gob.mx/sie/bdiController

Mexico's Energy Secretariat, Power Sector's Outlook 2004-2013, Comisión Federal de Electricidad (CFE).

Table 4C. United States Demand By Sector (1980 – 2005)

	1980	1990	2000	2004	2005
Petroleum					
(Thousand Barrels per Day)					
Residential	911	767	897	893	889
Commercial	606	465	383	395	412
Residential & Commercial	1,517	1,231	1,280	1,288	1,301
Industrial	4,842	4,304	4,903	5,082	5,066
Transportation	9,546	10,888	13,012	13,621	13,666
Total	15,905	16,423	19,196	19,991	20,634
Natural Gas					
(Billion Cubic Feet)					
Residential	4,752	4,391	4,996	4,879	4,873
Commercial	2,611	2,623	3,182	2,984	3,061
Residential & Commercial	7,363	7,014	8,179	7,863	7,935
Industrial	8,198	8,255	9,293	8,515	7,866
Transportation	635	660	655	687	692
Total	16,196	15,929	18,127	17,064	16,492
Coal					
(Million Short Tons)					
Residential	1.4	1.3	0.5	0.5	0.7
Commercial	5.1	5.4	3.7	3.8	3.8
Residential & Commercial	6.5	6.7	4.1	4.2	4.6
Industrial	127.0	115.2	94.1	84.9	86.6
Transportation	N/A	N/A	N/A	N/A	N/A
Total	133.5	121.9	98.3	89.1	91.2
Electricity					
(Gigawatthours)					
Residential	717,495	924,019	1,192,446	1,293,449	1,352,300
Commercial	558,643	838,263	1,159,347	1,228,505	1,281,100
Residential & Commercial	1,276,138	1,762,282	2,351,793	2,521,954	2,633,400
Industrial	815,067	945,522	1,064,239	1,020,883	1,034,300
Transportation	3,244	4,751	5,382	7,674	8,400
Total	2,094,449	2,712,555	3,421,414	3,550,512	3,676,600

Notes: Totals may not equal sum of components due to independent rounding. N/A: Not Available.

Sources: 1980 through 2004: U.S. Department of Energy, Energy Information Administration (EIA), *Annual Energy Review 2004,* DOE/EIA-0384(2004) (Washington, DC, August 2005), and *Monthly Energy Review,* DOE/EIA-0035(2005/10) (October 2005). Estimates for 2005: EIA, *Short-Term Energy Outlook,* DOE/EIA-0383(2005/10) (Washington, DC, October 2005).

Appendix 2. The North American Energy Working Group

In early 2001, the then-Canadian Prime Minister Jean Chretien, Mexican President Vicente Fox, and U.S. President George W. Bush recognized that, as neighbors, their energy issues merited regional attention and agreed on the benefits derived from enhanced trilateral cooperation in this area. At the Hemispheric Energy Ministers Meeting in Mexico on March 8, 2001, the heads of Natural Resources Canada, the Mexican Secretariat of Energy, and the U.S. Department of Energy formally committed to work together to facilitate a stronger North American energy sector.

To achieve this goal, the three department heads agreed to establish a group of senior officials from the three nations to focus specifically on the energy issues of the region – the North American Energy Working Group (NAEWG). The concept of the NAEWG was announced by the three Heads of State at the Summit of the Americas in April 2001 and is jointly chaired by the three energy departments.

The overall direction of the NAEWG comes from a working group made up of senior officials from each country. On June 27-28, 2001, this group conducted its first meeting in Washington, D.C., with the U.S. Department of Energy as host of the inaugural gathering and an address by the then-Secretary of Energy Spencer Abraham. Since then, there have been eight more full working group meetings convened in various locations in each of the three countries, with many more meetings of the various expert groups convened under the NAEWG agenda.

At its first meeting, the NAEWG established three subordinate expert groups: the Energy Picture Experts Group; the Electricity Experts Group and the Energy Efficiency Experts Group. It added three more expert groups in 2003: the Science and Technology Experts Group; the Natural Gas Trade and Interconnections Experts Group; and the Critical Infrastructure Protection Group. The expert groups collect, analyze, and report information, ideas and recommendations. Their members convene regularly to build work plans and develop mutually beneficial deliverables, continuously identifying and implementing areas of cooperation within the continental energy market.

Energy Picture Experts Group

The North American Energy Picture Experts Group was formed in 2001 with the goal of providing an overview of the North American energy sector by cooperating to produce a summary document of the region's economy, energy supply, demand, infrastructure, policies, laws, regulations, energy data and energy projections utilizing each country's policy, regulatory and statistical information. The Group agreed to produce updates to this document on a regular basis.

The *Energy Picture II* demonstrates the strength and vitality of the North American energy system.

The value of collaboration on energy issues has been recognized for some years among the countries of the Western Hemisphere. Representatives from North America, the Caribbean, Central America, and South America met in 1994 at the Summit of the Americas and began a "Hemispheric Energy Initiative," which supports a range of cooperative energy discussions and activities within the region. The NAEWG continues to build on this effort by exploring innovative ways Canada, Mexico and the United States can work together to expand interconnections and maximize trade.

Through strong cooperation, the NAEWG has produced many deliverables. On June 10, 2002, it released its first deliverable, *North America – The Energy Picture.* This report presented a range of energy information for the three countries, including an economic overview, energy data, supply and demand trends, energy projections and descriptions of infrastructure, laws and regulations.

On December 17, 2002, the Group released its second report, *North American Energy Efficiency Standards and Labeling*. This report highlighted Mexico's adoption of new standards for energy efficiency, resulting in the harmonization of minimum efficiency requirements and test procedures for refrigerators, freezers, electric motors, and window air-conditioners, strengthening the market for high-efficiency products in North America.

On December 23, 2002, the Group released its third deliverable, *North America – Regulation of International Electricity Trade*. An overview of regulations governing the construction and operation of power lines and the authorization of electricity exports and imports in the three countries, this report serves as an important reference document and guide for participants in international electricity trade. In January 2005, the Group released a companion to the 2002 electricity report, the *Guide to Federal Regulation of Sales of Imported Electricity in Canada, Mexico and the United States*.

On February 25, 2005, the Natural Gas Interconnections and Trade Experts Group released the electronic version of the *North America Natural Gas Vision* report and published the print edition in August 2005. This report addressed natural gas regulations and policies, production, interconnections, trade, transportation, transmission, distribution, consumption, and liquefied natural gas, as well as supply and demand projections.

The NAEWG has made additional efforts toward achieving its goals, some of which include expanding the objectives of the Energy Star energy efficiency standards program from the United States and Canada to Mexico and working towards sharing best practices and science and technology lessons-learned. For example, the Group has planned and hosted several information-sharing conferences since its establishment, such as a Private Sector Gas Workshop in 2003, a Fluidized Bed Combustion Training Workshop in 2004, an Energy Efficiency Workshop in 2005, and an Electricity Workshop in 2006

Most importantly, the NAEWG has been successful in fostering communication among the countries. The energy departments in Canada, Mexico, and the United States have worked closely and intensively toward identifying and removing market obstacles, while respecting the policies, laws and regulations of each nation. The expert groups are in regular contact via meetings, e-mail, and phone conferences to achieve the NAEWG goals. In this manner, the group has set a standard for international relationships of integrating systems and programs while maintaining the sovereignty of each nation.

On March 23, 2005, Canadian Prime Minister Paul Martin, Mexican President Vicente Fox and U.S. President George W. Bush announced the formation of a trilateral, cooperative program – the Security and Prosperity Partnership of North America (SPP). The goal of the SPP is to protect the region against terrorism and expand trade through greater cooperation and information sharing. To ensure the success of the SPP, cabinet secretaries and ministers organized trilateral working groups based on focus areas identified by the Heads of State, including a group for energy. Moreover, all three nations agreed that the NAEWG, already established and working successfully, would be the body used to achieve the expanded energy goals under the SPP. The NAEWG is now considered a SPP working group, with enhancements to its original purpose. Under the SPP, the number of expert groups expanded to nine, with the addition of the Oil Sands Experts Group, the Nuclear Collaboration Experts Group, the Hydrocarbons Experts Group, and the Regulatory Experts Group. The Critical Infrastructure Experts Group moved under the SPP's security mandate.

As part of the SPP, the NAEWG is working to achieve the following goals laid out in the energy agenda through nine expert groups in the following areas:

- Expand science and technology collaboration;
- Increase energy efficiency collaboration;
- Increase regulatory cooperation;
- Enhance electricity collaboration;
- Encourage greater economic production from oil sands;
- Increase natural gas collaboration;
- Enhance nuclear collaboration;
- Enhance cooperation on hydrocarbons;
- Improve transparency and coordination in energy information, statistics and projections.

For a detailed report on the Security and Prosperity Partnership and NAEWG's activities, visit www.spp.gov. Electronic versions of NAEWG reports are available at the following sites:

- ***North America – The Energy Picture*:**

United States: http://www.eia.doe.gov/emeu/northamerica/

Canada: http://www2.nrcan.gc.ca/es/es/naewg/NAEnergyPictureOnlinPub_f.cfm

Mexico: http://200.23.166.141/work/resources/LocalContent/1280/1/images/pe.pdf

- ***North American Energy Efficiency Standards and Labeling*:**

United States: http://www.eere.energy.gov/buildings/appliance_standards/pdfs/naewg_report.pdf

Canada: http://oee.nrcan.gc.ca/efficaciteenergetiqueAN/I.cfm?Text=N

Mexico: http://www.conae.gob.mx/wb/distribuidor.jsp?seccion=1877

- ***North America – Regulation of International Electricity Trade***

United States:

http://www.fossil.energy.gov/programs/electricityregulation/publications/electricitytraderegulation.pdf

Canada: http://www2.nrcan.gc.ca/es/erb/erb/francais/view.asp?x=690

Mexico: http://200.23.166.141/work/resources/LocalContent/1191/1/images/sbs.pdf

- ***North American Natural Gas Vision***

United States: http://www.pi.energy.gov/pdf/library/NAEWGGasVision2005.pdf

Canada: http://www2.nrcan.gc.ca/es/es/naewg/NANaturalGasVision_f.cfm

Mexico: http://www.energia.gob.mx/work/resources/LocalContent/2183/28/visionfinassegundasGN.pdf

- ***Guide to Federal Regulation of Sales of Imported Electricity in Canada, Mexico and the United States***

United States: http://www.pi.energy.gov/pdf/NAEWGERGuideFINAL1-26-05.pdf

Canada: http://www2.nrcan.gc.ca/es/erb/erb/francais/view.asp?x=690

Mexico: http://www.cre.gob.mx/publica/gtean/guide-spanish.pdf

Appendix 3. Liquefied Natural Gas (LNG)

Improved technology and market conditions are making liquefied natural gas (LNG) competitive with other sources of natural gas, raising the profile of LNG in recent years. While the technology making LNG possible has existed for almost five decades, energy providers built few terminals in the United States and none in Canada or Mexico. This reluctance came in part due to previous high costs and public misconceptions about this form of natural gas, misconceptions that continue to cloud discussions over facility siting and other regulations.

LNG enables economic transport of natural gas to consumers located at long distances from supplies without the need for extensive pipeline systems. LNG is natural gas, consisting almost entirely of methane, condensed to an odorless, colorless, non-corrosive, and non-toxic liquid through cooling. At atmospheric pressure, methane condenses to a liquid at -259ºF (-161ºC), which allows for transportation and storage at low temperatures. The reduction in volume is a factor of more than 600, meaning that one shipload of 138,000 cubic meters of LNG – about the size of a Very Large Crude Carrier – can deliver close to 3 billion cubic feet (Bcf) of natural gas, or about 4 percent of the North American average daily demand for this fuel. On the receiving end, regasification facilities warm the liquid in order to induce vaporization, which is delivered into the natural gas delivery transmission systems. In some instances, LNG is transported in its liquid state by truck.

Perceived safety and security concerns have led to public opposition to the construction of LNG terminals. Increased awareness about the physical properties of LNG and industry safety standards should allay this resistance.

The density of LNG is less than half that of water, so if LNG were to be accidentally spilled onto water it would float and then rapidly vaporize. An open container of LNG at room temperature and pressure looks and behaves much like a container of boiling water. Like other hydrocarbons, LNG is flammable under some circumstances, although these risks are lower than for other hydrocarbons.

In addition, the LNG industry has safety and health mitigation systems in place to reduce the likelihood of occupational hazards and ensure protection to the environment, workers, and the surrounding community in the unlikely event of an accidental LNG release. These measures include containment activities, exclusion zones, thorough security and operational procedures, and emergency response protocols, which are monitored and enforced by federal agencies in Canada and the United States.

LNG possesses an enviable safety record, including more than 33,000 international shipments, amounting to an excess of 300 trillion cubic feet (Tcf) shipped without a serious accident. In addition, there have been no major accidents related to the normal operations of an LNG facility in North America.